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FIFTY-EIGHTH YEAR

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NEW YORK, MONDAY, JULY 31, 1916.

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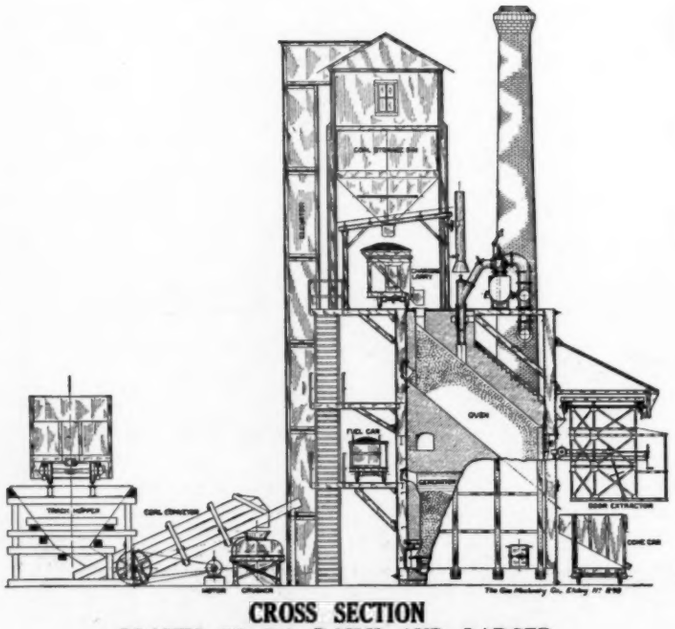

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CLEVELAND, OHIO

1859 FIFTY-EIGHTH YEAR 1916

AMERICAN

GAS LIGHT JOURNAL

VOL. CV., No. 5. NEW YORK, JULY 31, 1916 WHOLE No. 3,047.

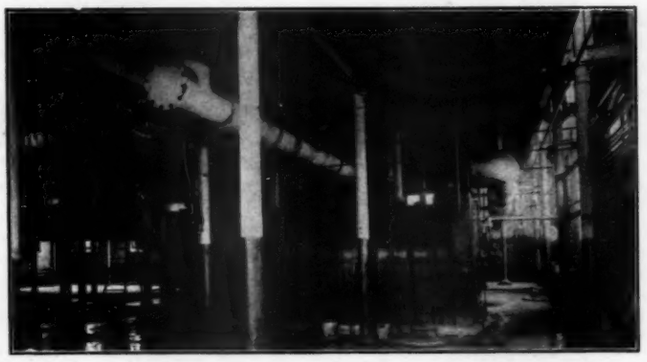
# Air Supply Adjustments in Rochester Gas Works Effect Saving of 64 Lb. of Fuel Per Ton of Coal Carbonized

## Test Showed that Over 350 Lb. of Coke Were Burned for Every Ton of Coal That Was being Carbonized Adjustments Reduced Fuel Consumption to 286 Lb. Per Ton

By WILLIAM H. EARLE

Assistant Superintendent, Gas Manufacturing Department, Rochester Railway & Light Company

In January, a test showed that over 350 lb. of coke were being burned for every ton of coal that was being carbonized in the Rochester, N. Y., gas works. By means of adjustments made to alter the air supply, through the dampers, the primary air ports and the secondary air ports, the fuel consumption was so reduced that tests made March 10, showed an average saving of 64 lb. of coke per ton of coal carbonized, or a total saving of 5,952 lb. per day. If such conditions can be maintained throughout the year, it will mean an annual saving of more than 1,000 tons of coke.



SCRUBBERS FOR COAL GAS AND BOTTOM OF PURIFYING BOXES

### Fuel Consumption a Large Item in Manufacturing Costs

The carbonization of coal at high temperatures, in most of the modern coal gas systems involves the attainment of temperatures ranging from 2,000 deg. to 2,400 deg. Fahr. This means considerably more than heating a few tons of coal to such a point. It necessitates the maintenance of equal heats on tons of refractory material, the retorts, and their settings. Obviously, then, the required fuel consumption is a large item in manufacturing costs, and its efficient control an important duty.

Modern retort installations vary widely in the details of design and construction, but all must comprise two principal essentials, namely, the retorts or carbonizing unit, and the furnace or heating unit. The settings at the Rochester Gas Works have nine horizontal retorts in each furnace and are commonly known as horizontal full depth "nines." The furnaces are producers of the recuperative type. That is, a portion of the sensible heat of the waste products of combustion is recovered by the secondary air on its way to the combustion chamber.

A full bed of fuel is maintained within the furnace, and air for

SETTINGS HAVE 9 HORIZONTAL RETORTS IN EACH FURNACE

COKE CHUTES AT ROCHESTER GAS WORKS

the primary combustion of this fuel is supplied at the primary air port, below the grate bars. This air as it rises through the bed burns the coke to carbon dioxide in the lower and cooler zones, but as it passes up through the hotter zones a large part is reduced again to carbon monoxide. The carbon monoxide is the true heating agent for the retorts.

### Two Objects Obtained

A secondary supply of air is admitted at suitable ports on each side of the furnace. The secondary air passages surround the waste gas flues which pre-heat the secondary air to a temperature approximately the same as that of the combustion chamber. Thus two objects are attained: A large amount of otherwise waste heat is recovered by reducing the temperature of the waste gases from 2,000 deg. or more to about 1,000 deg. Fahr., and the secondary air is admitted to the combustion chamber at such a high temperature that there is no tendency for it to chill the producer gases, or any portion of the setting. The primary air has to pass over a small bed of water under the grates. There are three reasons for this: First, it cools the bars, and increases their life; second, it softens the clinker; and third, the vapor rising through the fuel, produces a certain amount of water gas, which forms a part of the producer gases.

At the end of each 4-hour carbonizing period, the hot coke from the middle tier of retorts is fed into the furnace to maintain the fire bed. The object is to keep the required temperature conditions, by drawing the smallest amount of coke possible from the middle tier of retorts.

### Matter of Ordinary Routine to Determine Fuel Consumption

It is a matter of ordinary routine to determine the number of pounds of bench fuel that is being consumed per ton of coal carbonized. The amount of coal delivered to the middle retorts is recorded. The quantity of coke recovered from that coal is also recorded and is usually taken at 65 per cent, a factor established by experience, and verified by test. That is, for every 100 lb. of coal placed in the middle tier, there will be 65 lb. of coke recovered.

If all the coke from the middle tier of retorts is fed into the furnace, it is a matter of simple arithmetic to determine the quantity of fuel consumed per ton. If the fire demands only a fraction of the coke, then the excess or unused coke may be saved, and weighed. A single subtraction will give the amount burned. That is all there is to the mechanics of a bench fuel test. It may be run on any single bench or on the entire installation simultaneously.

### Test Indicates Waste

A test of such a nature was made at the Rochester Gas Works in January. It showed that over 350 lb. of coke were burned for every ton of coal that was being carbonized. Practical experience condemned such a figure at once.

When a given volume of carbon burns, it unites with exactly twice that volume of oxygen, and forms twice its own volume of carbon dioxide. That is, the volume of carbon dioxide formed is equal to the volume of oxygen consumed.

The composition of air is commonly given as 79 per cent nitrogen, and 21 per cent oxygen. It is evident then, that where ordinary air is the medium of combustion the theoretically perfect result would occur when all the carbon is completely burned to carbon dioxide, and the waste products show just 21 per cent of carbon dioxide. Such results are scarcely to be attained in ordinary practice, but they are approachable, and the degree to which they are approached is the measure of furnace efficiency. Therefore, the determination of the percentage of carbon dioxide in the products of combustion is the first step in an analysis of questionable conditions. The modern Orsat apparatus makes this determination practicable in a very simple and rapid way. In the case above mentioned, the average test showed 13.0 per cent carbon dioxide, a result which is only fair.

A further idea of combustion conditions may be obtained by determining, with an Orsat apparatus, the percentages of carbon monoxide and oxygen in the waste gases. If carbon monoxide is present, it is an immediate proof of incomplete combustion, or an insufficient supply of air. If, however, carbon monoxide is not present, and the percentages of carbon dioxide and oxygen total 21 per cent, there is evidently a large excess of air being supplied to the fire, throwing an added burden upon the entire system. The next step is to attempt to increase the carbon dioxide percentage at the expense of the oxygen by reducing the air supply.

### Points at Which Adjustments may be Made

There are three distinct points at which the adjustments may be made to alter the air supply; namely, the dampers, primary air ports, and secondary air ports. The most positive of these are the primary air ports and the dampers. The secondary air slides are usually set at a point dictated by the experience of general practice.

There is, however, a more or less definite relation between the area of the secondary air opening, and that of the primary. For further adjustments, frequent readings are taken from the draft gauge connected just above the dampers on each side of the bench. Draft conditions in the combustion chamber are also observed, but it is impracticable to use instruments at the latter point, owing to the intense heat.

Temperature fluctuations in the setting and the gas yield which is directly affected by the temperature conditions should be carefully watched throughout the adjustment period. Where accurate comparative results are sought an ideal instrument for temperature observations is a pyrometer of the Fery type. Otherwise a simple instrument of the blue gas pyrometer type is of assistance.

Temperature variation over any considerable range can be detected by the low gas yields, or, in case of excessive temperatures, by trouble with pitch, lamp black and so forth. For that reason, the temperature condition is approximately established, and all changes must be made with that fact in mind.

If the draft above the damper is high, a large amount of air will be drawn through the fire, causing rapid combustion, and high temperatures, provided the secondary air is balanced with the primary. If, however, the secondary air ports are open too wide more air will be carried into the combustion chamber than is required by the producer gases, causing the temperature to drop. Conversely, too little secondary air will prevent complete combustion of the fuel gases, likewise with a decrease in temperature. If the damper opening is reduced too much, and the primary and secondary air slides are open too wide, the combustion chamber is crowded with gases which, after combustion, have insufficient outlet. After the combustion is completed, the life of the gases is gone, and they begin to cool down, causing a decrease in the bench temperatures.

### Ideal Condition

The ideal condition is one in which the producer operates with a minimum draft; this means retarded combustion, and consequent low fuel.

At the same time, sufficient producer gases must be put into the setting, to support the required temperatures; sufficient secondary air should be admitted to maintain to complete combustion with minimum excess air, and the gases in the combustion chamber must be held long enough to derive full benefit from the heat generated.

The actual establishment of conditions approximating such an ideal may require days or even weeks, depending upon the initial conditions.

Such adjustments as these were attempted following the test previously mentioned, and on March 10 another fuel test was run. This test showed an average of 286 lb. of fuel per ton of coal carbonized, a reduction of about 64 lb. per ton—a saving of 5,952 lb. of fuel per day, or nearly 3 tons. If such conditions can be maintained throughout a year, the economy would aggregate more than a thousand tons.

## Gas Ranges Will Cook Meals for Border Guard

Arrangements are being made with the El Paso, Texas, gas company to lay gas mains to the military camps in that vicinity.

Gas ranges will be installed and the burden of the cooks and kitchen police will be lessened considerably. At present any kind of a range is used to cook upon and mesquite root and branches and the scanty supply of stove wood are used for fuel.

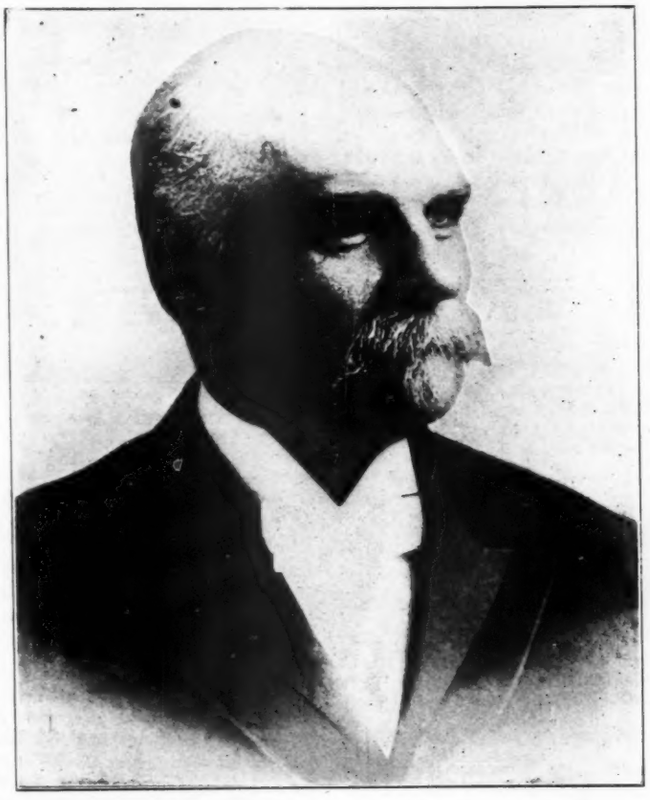
# Two-thirds of Manufactured Gas Sold to American Consumers To-Day is Used for Purposes Other Than Illumination

**In 56 Years the Number of Gas Companies has Increased Almost Four Times, the Population Supplied More than Six and One-Half Times, and the Capital Invested Twenty-Five Times—Welsbach Mantle has so Cheapened Gas Lighting that, in Cost Per Unit of Illumination, it has no Artificial Competitor.**

A century and a quarter covers, with some margin, the history of gas as a public service. During the 56 years, since 1860, the growth of the industry has been especially rapid. In that time the number of gas companies has increased almost four times, the population supplied more than six and one-half times, and the capital invested twenty-five times. It is probable that the sales of gas have increased sixty-three times. At the present time the capital invested in the industry is approximately $1,100,000,000 and the annual output is approximately 190,000,000,000 cu. ft. The Welsbach mantle has so cheapened gas lighting that, in cost per unit of illumination, it has not an artificial competitor.

Though there is small prospect of further material reduction in rates for gas and electricity, there is a possibility that artificial light may be further cheapened through improvements in lamps. These points were brought out by Walton Clark, president of Franklin Institute in his paper on the History of Gas Lighting, presented at the American Gas Centenary at Baltimore, June 16, of which the following is an abstract:

Great as has been the gain to the world from the introduction of gas, providing, available for instant use, a substance measured as used, occupying no space on the premises of the user, and yielding light upon combustion, there is another use to which it has of late years been applied, which seems to me to transcend gas lighting in importance as a social factor. I refer to the use of gas for cooking and other domestic purposes.



PROF. T. S. C. LOWE

The gas engineer, contemplating the work of his guild from 1816 to 1916, will perhaps hesitate to claim for the present day brilliancy of the nocturnal lighting of the world any great and beneficial influences on the happiness of man. But he will assert with vigor, and prove with ease, that the use of his product in city kitchens, and, particularly, in the kitchens of people whose related women folk do the family cooking, has worked a social good, difficult to exaggerate, which places it among the very few of the century's industrial developments that are obviously of great benefit to the people, financially, physically, mentally and morally.

A century and a quarter covers, with some margin, the history of gas supply as a public service. The English maintain that the father of gas lighting as a public service industry is Murdock. The French maintain that Lebon is properly regarded as the father of gas lighting. The accompanying illustration is from a photograph of a statue of the latter, sent by A. Pechine, the sculptor, who calls attention to the fact that Lebon was assassinated in the streets of Paris in 1804.

"Opinion is divided," he naively adds, "as to the motive of the crime. Some think he was mistaken for Napoleon, to whom he bore a resemblance, and others that he was assassinated by the order of the English Government because of his claim to being the inventor of gas lighting."

It was known prior to 1700 that the dry and destructive distillation of coal and other carbonaceous substances produced an inflammable gas, which, upon burning, gave light. It was practically a century later that the idea of producing this gas for the purpose of lighting was conceived.

As is frequent with great discoveries and developments, people in different countries appeared to have the idea about the same time.

A professor in the University of Louvain—J. B. Minckelers—in 1784 distilled coal to produce gas for aeronautical purposes, and in 1785, he lighted his lecture room with gas so produced.

Phillippe Lebon, in 1799, patented what he described as "a new method of employing fuel with greater utility, either for heating or lighting, and to obtain certain products therefrom." The description showed that he had in mind producing illuminating gas from the distillation of wood or coal. He had made experiments in this direction fifteen years earlier.

William Murdock began his experimenting about 1792, and, in 1797, he lighted his own premises with coal gas. He later, in 1802, lighted the Soho Engine Works with coal gas. About this time Napoleon called the proposition to supply gas for lighting "Une Grande Folie." Later, Walter Scott called it "a pestilential innovation."

## Demonstrated in Philadelphia in 1796

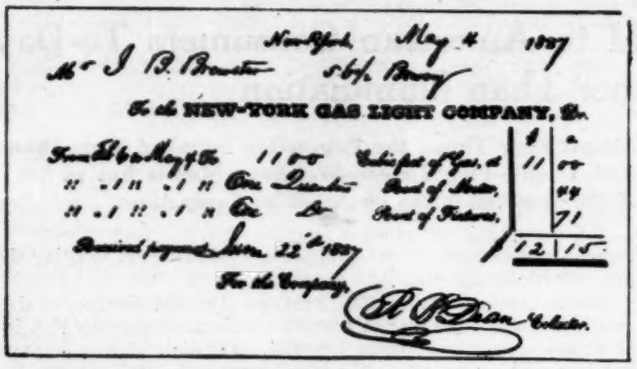
The first company to be chartered for the supply of gas for illuminating purposes was the London & Westminster Chartered Gas Light and Coke Company, and its date was April 30, 1812.

The first exhibition of coal gas as an illuminant in the United States was in Philadelphia. In 1796 that city, always prominent in matters relating to the gas industry, and, except for its disastrous experiment with municipal ownership, always with an enviable prominence—had a sight of the "folie."

The first recorded instance of the use of manufactured gas for domestic illumination in the United States fixes the date at 1806.

In that year David Melville, of Newport, R. I., lighted his house, and the street in front of it, with gas manufactured upon his premises.

This was one year before the first public gas-lighting venture in England, but it was four years after the display made at the Soho factory of Boulton & Watt, and nine years after William Murdock lighted his premises in Old Cumnock with gas of his own manufacture. Melville improved his apparatus from time to time,




CHARGE FOR 1,100 CU. FT. IN 1827 WAS A FIGURE TO BE RECKONED WITH

finally patenting it in 1813. He introduced gas for the lighting of a cotton mill at Watertown, Mass., and of a mill near Providence; and, in 1817, employed it in lighthouse illumination.

From this small beginning the gas industry in America grew at first slowly, and later, with the development of improved apparatus and the acquirement of more accurate knowledge of the physical laws involved, much more rapidly. In 1816 a company was chartered in Baltimore. In 1822 Boston adopted gas lighting. In 1823 a company was organized in New York City. In 1825, Brooklyn, New York, and Bristol, R. I., were lighted with the new illuminant. In 1835 the New Orleans Gas Light Company was chartered. The dates of the first lighting by gas of some of the prominent cities of the world is given in the following table:

| | |
|---|---|
| London | 1807 |
| Paris | 1819 |
| Baltimore | 1821 |
| Boston | 1822 |
| New York | 1823 |
| Berlin | 1827 |
| New Orleans | 1835 |
| Philadelphia | 1836 |
| Pittsburgh | 1836 |
| Louisville | 1838 |
| Cincinnati | 1841 |
| Albany | 1845 |

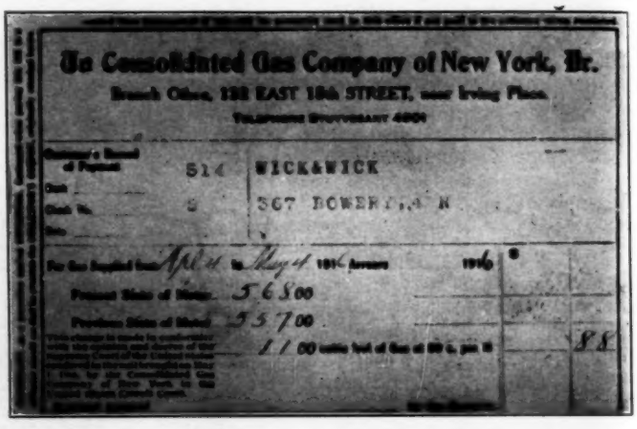
These include the pioneer companies in the United States, and the number grew until, in the year 1859, there were, according to tables prepared by the AMERICAN GAS LIGHT JOURNAL, 297 companies with a capitalization of $42,861,174, supplying a population of 4,857,000 through 227,665 private meters.

GROWTH OF INDUSTRY RAPID SINCE 1860

From 1860 the growth of the business has been rapid, until in 1916 the capital invested is, approximately $1,100,000,000 and the annual output is approximately 190,000,000,000 cu. ft., supplying a population of 32,000,000 people. Thus, in fifty-six years the number of companies has increased almost four times, the population supplied more than six and one-half times, and the capital invested twenty-five times. It is probable that the sales of gas have increased sixty-three times. There can be little doubt that there are in the United States to-day nearly 5,000,000 premises supplied with manufactured gas.

This recent great growth in the number of consumers of gas, and the much greater increase in the amount of gas sold, is not all to be credited to the merits of gas as an illuminant. It is probable that nearly, if not quite, two-thirds of the manufactured gas sold to American consumers of to-day is used for other purposes than illumination.

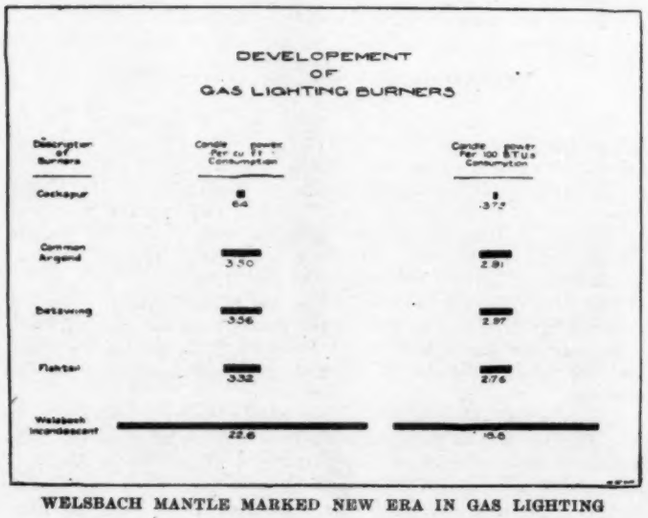
In the first days of gas lighting, in America, the material used was almost exclusively "soft" or bituminous coal. This gas had



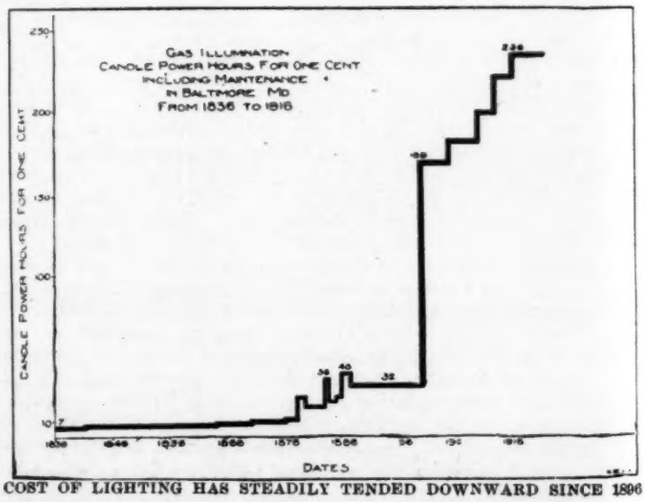

CHARGE FOR SIMILAR QUANTITY TO-DAY IS INSIGNIFICANT AMOUNT

an illuminating value of 15 to 17 candles, and was considered a brilliant illuminant in the earlier days, when comparison was made with whale-oil lamps and tallow dips. But the advent of kerosene oil and the improvement in oil lamps marked the commencement of an era of higher candle power, and, by creating a new factor in the competition for urban lighting, promised to reduce the rapid growth of the gas business.

At this crisis in the history of gas lighting, a Frenchman, Tessie du Motay, and an American, Professor T. S. C. Lowe, were independently experimenting in the manufacture of gas by the dissociation of steam in contact with incandescent carbon. The result of these experiments was the development of the so-called "water gas" systems that bear the names of the distinguished inventors—the cupola-retort system of du Motay, and the generator—super-

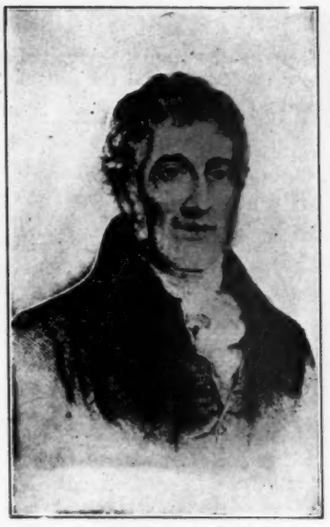



WELSBACH MANTLE MARKED NEW ERA IN GAS LIGHTING




COST OF LIGHTING HAS STEADILY TENDED DOWNWARD SINCE 1896

ROBERT W. BUNSEN



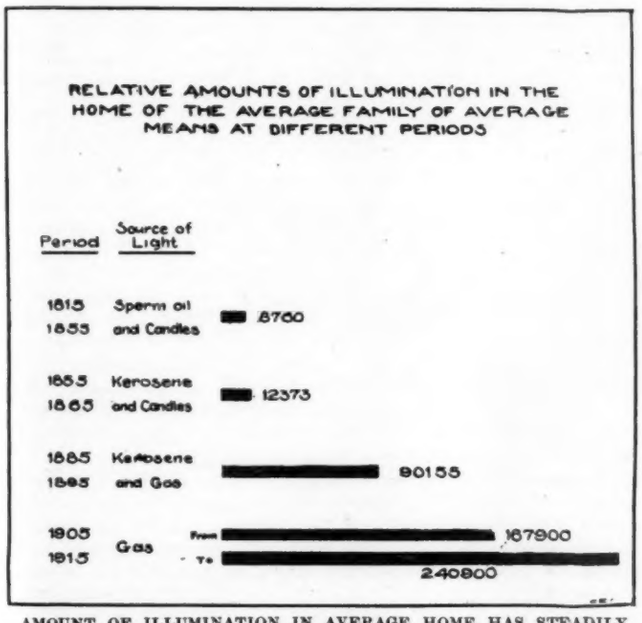
WILLIAM MURDOCH

PHILIPPE LEBON

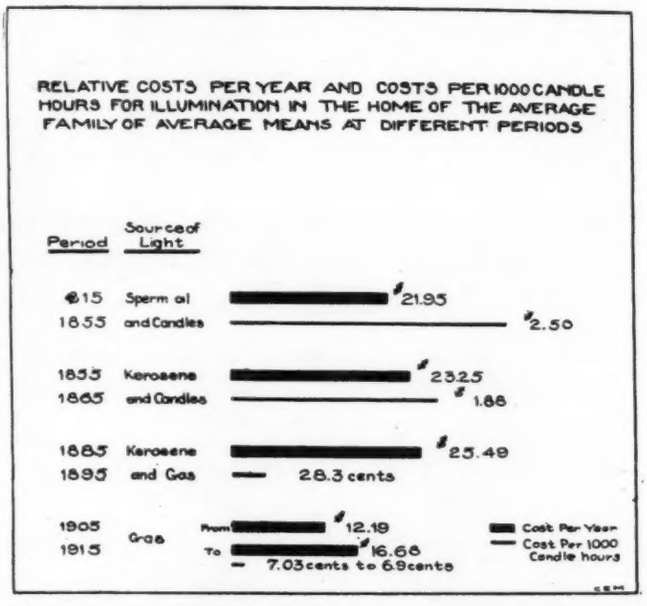
DR. AUER VON WELSBACH

heater system of Lowe—the latter the most important of all inventions affecting the manufacture of gas. The experiments of Tessie du Motay, as well as of Lowe, were carried on in the United States, and the development of the water gas system is purely American.

The superiority of the Lowe process over all its water gas rivals has been so far demonstrated that the du Motay and other systems of water gas production have entirely disappeared and approximately 70 per cent of all the gas being made in the United States at this time, for distribution, is made on Lowe water gas apparatus, or some modification thereof. The remaining 30 per cent is coal or oil gas.


RELATIVE AMOUNTS OF ILLUMINATION IN THE HOME OF THE AVERAGE FAMILY OF AVERAGE MEANS AT DIFFERENT PERIODS
Period
Source of Light
1815 1855 Sperm oil and Candles 8760
1855 1865 Kerosene and Candles 12373
1865 1895 Kerosene and Gas 90155
1905 1915 Gas From 167900 To 240800

AMOUNT OF ILLUMINATION IN AVERAGE HOME HAS STEADILY INCREASED


RELATIVE COSTS PER YEAR AND COSTS PER 1000 CANDLE HOURS FOR ILLUMINATION IN THE HOME OF THE AVERAGE FAMILY OF AVERAGE MEANS AT DIFFERENT PERIODS
Period
Source of Light
1815 1855 Sperm oil and Candles $21.95 $2.50
1855 1865 Kerosene and Candles $2.325 $1.88
1865 1895 Kerosene and Gas $25.49 28.3 cents
1905 1915 Gas From $12.19 To $16.66 7.03 cents to 6.9 cents
Cost Per Year
Cost Per 1000 Candle hours

COST PER UNIT OF ILLUMINATION HAS DECREASED MATERIALLY SINCE ADVENT OF GAS

### Advent of the Electric Light

A few years after the invention of the water gas processes, and during their development, the electric light appeared on the field as a competitor for the business of city illumination, and it promised to prove formidable.

About 1890 the gas lighting industry obtained a new and powerful weapon for use in its competition with electric lighting, in the so-called Welsbach incandescent gas lamp. This lamp develops an illuminating power of twenty candles per cubic foot of gas used, which is 6 or 7 times more than could be obtained with the best burners known thirty years ago.

The Welsbach invention has so cheapened gas lighting that it may be said that in cost per unit of illumination gas lighting has no competitor but the heavenly bodies.

The suggestion of a possible further reduction in the cost of nocturnal illumination—a reduction that shall mean a reasonable amount of lighting in homes now, through poverty, dark; rendering safer, more beautiful, and more cheerful the surroundings of the poor—carries much of inspiration to the engineers of the lighting fraternity.

There is promise of such reduction, cheap as artificial illumination now is, cheapened as it has been through decades that have witnessed a cheapening of little else. Small room though there is for a further reduction in the cost of gas and electricity, there is prospect of a cheapening of light through improvements in gas and electric lamps.

In the conversion of energy—actual and potential—through thermodynamic or chemical action—into light, there is a development of heat, necessary to the process, but greatly out of proportion to the lighting result obtained. The whale oil lamp con-

verted to light one five-thousandth part of the energy stored in the oil. The standard sperm candle also converts to light one five-thousandth part of the energy developed in its combustion. The most efficient artificial lighting unit known at the present time is the yellow flame electric arc light, and this delivers as light, but 1/15 of the energy of the electric current producing it, and but 1/100 of the energy in the coal which is the ultimate source of electric energy. The Welsbach domestic gas lamp yields as light 2/1000 of the energy in the gas burned in it.

The brains and hearts of men of the highest scientific attainment are devoted to this opportunity—not of making brighter the places already bright, but of so cheapening artificial light that they who, through poverty, now sit in nocturnal darkness may have light; and that what light is had, and by whatever class it is had, may be so applied to use as to simplify the lives and beautify the surroundings of the users.

### Relation of Gas Men to Public

Among the most notable facts in the history of gas lighting, particularly in the history of the latter half of its century of life, is, to my mind, the relation borne by the guild of gas men to the consuming public, entitling them to claim to be, in the best sense, public servants.

Within the memory of men still active in the industry, the selling price of gas in America has been reduced about 60 per cent. This has been coincident with an increase in the cost price of every item of material and energy that enters the manufacture of gas.

Gas lighting has proven no factor in the high cost of living. In the algebraic sum that represents the increased cost of living, it is a negative quantity.

All this has come through patient searching of the laws of nature, through canvassing, through insistence and persistence in getting consumers to use appliances that would be useful to them and save them money. These efforts have so extended the sale and reduced the cost of producing gas, that it has been possible to reduce the price, as has been said, to 40 per cent of what it was half a century ago, and, coincidently, to improve the service to a degree not easy of statement.

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# Future Commercial Representative of the Gas Industry Will be Thoroughly Trained Man

**Jansen Haines Describes Developments in the Selling End of the Gas Industry—Points out Progress Attained and Indicates Lines which will be Followed in Future**

The application of science and engineering by trained minds has gradually overcome the difficulties encountered by early gas men. A staple and reliable product was thus developed. By-products resulting from the conversion of coal into gas, which had previously been discarded as waste, were investigated by the chemist and the engineer, and valuable uses for them resulted. Efficiency in manufacture and distribution was slowly but surely attained, thereby lowering the cost of gas to the producer, and to the consumer as well, until finally a perfected product was placed before the public—a necessity for many, a luxury for all. These assertions were made by Jansen Haines, president of the National Commercial Gas Association, in a paper presented at the meeting held in commemoration of the American Gas Centenary at Baltimore, June 16. Other features of Mr. Haines' address are the following:

### Little Attention Paid to Marketing Product in Early Days

During this period all attention was given to perfecting the product, and but little thought was devoted to seeking a market for it. Gas was first used for lighting city streets and public places, and, owing to the high price, at first was used by a few wealthy people in private houses. These homes were largely lighted as a novelty, and then only upon the demand of the owner. There was little or no organized effort on the part of the gas companies to secure business.

Later the commercial side of the business asserted itself, but only by degrees, and in the lighting field. As the character of service rendered by the gas companies in those days left much to be desired, and the salesmen, who had little or no understanding of the principles of the illumination as understood to-day, were frequently discouraged.

It was 25 years after the founding of the first gas company, before the air-mixing device for the use of gas as a fuel was discovered; 15 years later the Bunsen burner was devised and the use of the blue flame developed.

The heat from a gas flame had been made to cook meat quite early, but rather as an experiment, and it was 55 years after the discovery of gas before the first regular advertisement of a gas stove appeared.

The cost of these stoves was so great that only wealthy people could use them, and the gas companies did little to encourage their use. The principles of temperature control were but little understood, and, again, the scientists and the engineers were called upon to apply the principles of chemistry and hygiene.

Temperature control, efficiency, safety, and the so-called domestic sciences were studied with the result that the evolution of modern appliances for cooking or heating, and other domestic purposes, were brought out; a development which occurred in less than half the present life of the industry.

### Development of Industrial Fuel Branch

Of recent years the improved and scientific methods of manufacture have tended to lower the cost of gas until it has come into successful competition with other forms of fuel. There have been developed new uses for gas, and an entirely new branch of the business, demanding a high standard of engineering practice. In fact, industrial fuel experts or engineers are now called upon daily to design new forms of furnaces, burners and appliances. The use of gas on any scale for industrial purposes is to-day scarcely more than 15 years old.

It was less than a generation ago that commercial and industrial departments of the gas companies were formed.

Many of the commercial gas men of 15 years ago knew little about the scientific principles of the appliances which they sold, despite the fact that the commercial gas man did not come into being until he had a product to sell worthy of his efforts.

### Commercial Representative No Longer Merely Glib Salesman

The commercial representative of the gas company to-day is no longer merely the glib salesman of yesterday, whose sole desire was was to dispose of his wares and get paid for them without regard to the economic necessities of the purchaser.

The commercial representative of to-morrow will be a trained man in his profession, educated in the physical properties of his commodity, and familiar with the design and the construction of the appliances which he handles, and with a complete understanding of the principles of chemistry and hygiene as applied to domestic gas equipment.

He must also have definite knowledge of the scientific principles of illumination, light, heat and power. His field is broad, and his thirst for knowledge must be keen.

The National Commercial Gas Association, of which I have the honor to be president, came into being 12 years ago, almost at the dawn of the commercial development of the gas business. The demand for the association arose to follow the trail blazed for it by the scientist and the engineer.

The commercial man and the National Commercial Gas Association could not exist until a perfected product had been developed to sell. For nearly 100 years the gas companies were content to supply their commodity to those who sought it.

Now, they supply one of the economic necessities of life, and are sending trained men into the field to extend and broaden its use, to seek the merchant, the manufacturer and the private citizen, and to urge upon them the great advantages offered to them by the use of a safe and convenient form of light, heat and power; thus a finished product, whose properties are thoroughly understood and guaranteed by the gas companies.

## Points Out Need of More Adequate Training For Engineers

**J. E. Aldred Criticises Present Day Educational Methods—Engineers Lack "Practicality"—Numbers of Enterprises Set on Foot that Never Should have been Given Birth**

Due, doubtless, to their training while in college, engineers are too frequently impractical. They work from the laboratory or drafting room out, and fail to perceive the difficulties the business man could point out. They seldom make an unfavorable report on any project. Numbers of enterprises are set on foot that never should have been given birth. These contentions were made by J. E. Aldred, chairman of the board of directors of the Consolidated Gas, Electric Light & Power Company of Baltimore, in an address at a meeting held in that city, June 16, in commemoration of the American Gas Centenary. Mr. Aldred's paper, in part, is as follows:

### Individuals Constitute Larger Part of Gas Company

It is the individuals that constitute the larger part of the gas company. The works are of minor importance. In Baltimore, I find, by studying the figures of the cost of production and distribution of this company over a long term of years, that the percentages vary but slightly.

The percentage of cost to-day, as against the amount that we receive, is practically the same as it was 30 years ago, and the percentage of cost of distribution is practically the same. Where the great success has been made in the gas business, has been where the company had the advantage of such a personnel as the Consolidated Company has here—a fine organization that has developed the business to the point where the output is on a great scale and the overhead charges are reduced to a minimum.

In that connection, I would like to say something growing out of experience I have had in my relation with engineers.

They are a most valuable body of men, and we could not by any possibility conduct gas and electric companies without them; but I think there is a great work for the universities in the training of men who are to go out and engineer these enterprises, along lines somewhat more practical than in the past.

I find that when we are dealing with engineers we have to overcome a disadvantage which seems to result from the training they have had in colleges, as that training results in their being minus the element of what I will call "practicality."

If you go back in the gas business or the electric business, you will find that there has been a vast waste of resources owing to faulty engineering, not as such, but in the application of it to a commercial and practical proposition.

### Of 500 Reports Presented on Projects Not One was Unfavorable

I have had presented to me in the past 15 years perhaps 500 reports on hydro-electro plants, and I have yet to see the first unfavorable report.

The engineer's report always is that the engineering project is one to be taken up. What is the result of this? It means that numbers of enterprises are set on foot that never should have been given birth. It means there is an infinite waste of money and time and energy. Why? Because the engineer only too often does not check up his proposition from the standpoint of the man on the outside; he works from the laboratory or from the drafting room out, and he should be checked up by some factor coming from the other end.

Only too often we find power houses—houses designed by engineers that never operated a power house. They do not have the requisite intelligence from the standpoint of actual operation.

I have seen them build power houses that were almost impossible to operate as such. Why should this go on year after year? Why should the patent office in Washington be crowded, in fact, be a mammoth mausoleum not of things that are good, but of things that are bad?

The percentage of effective inventions is something like one per cent of the total; the rest is absolute waste.

Think of the energy and time that has been lost in multiplying these useless devices.

It is more or less so in the business that I have had to do with. It is not that engineers are less capable of showing sense and judgment than other people, but it is because they are sent out from educational institutions without having had it properly impressed upon them through their courses of training, that the limiting factor must be common sense and practicality.

---

## Gas from 90 By-Product Coke Ovens Supplements Supply from Furnaces in Duluth Steel Plant

Ever since the development of the enormous iron-ore deposits lying to the north of Duluth, Minn., projects have been agitated to convert the ore into finished iron and steel on the spot, instead of transporting the former nearly a 1,000 miles by water and 100 miles by rail to the furnaces of the Pittsburgh district.

The United States Steel Corporation, after the completion of its plant at Gary, Ind., some years ago, undertook the development of steel manufacture at Duluth. Within the present year a steel-manufacturing plant involving the investment of some $20,000,000 has been completed.

There are two 500-ton blast furnaces and ten open-hearth steel furnaces of 75-tons capacity each. The rolling mills in connection with the plant are equipped to turn out steel rails, structural shapes, or merchant bars. The ingots produced are 22x26x77 in., and are handled in a 40-in. reversing blooming mill, the exhaust steam from which is utilized by a low-pressure steam-turbine electric-generator unit.

The gas from the furnaces is utilized in four twin-tandem gas-engine generator sets of 3,000-kw. capacity and five single-tandem gas-blowing engines of 24,000-cu. ft. capacity each.

The coal brought by the Lake steamers is converted into coke in 90 Koppers by-product coke ovens, so that the plant has the gas from these ovens available for use as well as the gas from the blast furnaces.

---

## Co-operative Board Has Proved its Value in Bettering Pavement Conditions in Chicago

The Board of Underground Work of Public Utilities has existed for more than five years in Chicago, and has amply proved its value in the betterment of pavement conditions. It is an unofficial body on which are represented the Peoples Gas Light & Coke Company, the Board of Local Improvements, the Chicago Postal Pneumatic Tube Co., the Chicago Telephone Co., the City Electrical Department, the City Press Association, the City Water Department, the Chicago Surface Lines, the Commonwealth Edison Co., the Postal Telegraph Cable Co., the Sanitary District of Chicago and the Western Union Telegraph Co. In short, it comprises all the public utility interests of the city sharing in the use of the streets. The object and work of the Board is to save the city pavements from avoidable openings. The secretary is constantly on the job to find out when and where new pavements are to be laid.

He brings to the attention of the interested public utilities any changes in their subsurface structures which are necessary or desirable before the new pavement is laid and keeps posted on whether or not these changes have been made before paving operations begin. In general, he is the go-between by which results are accomplished without the usual red tape and misunderstandings. The secretary has no authority to order work done, nor does he devise ways and means to do it. That is the work of the responsible bureau or corporation officials.

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## Why Not Use Gas?

"Why not use gas?" asks Frank Albers, of the transportation department of the New Orleans Railway & Light Company, who adds the information that:

At the current market rates, gas is cheaper than any other fuel. Efficiency and cost are the quantities that we figure the relative values of any agent. Gas will stand these tests.

Gas has been known for years as an efficient heat-producing agent; it remained for low cost to popularize this modern fuel.

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## An Element Lacking in the Training of Engineers

On another page in this issue there is abstracted from the address of J. E. Aldred, chairman of the board of directors of the Consolidated Gas, Electric Light & Power Company of Baltimore, certain pertinent, and, unhappily, true statements in regard to the training of engineers, that should provide food for serious thought to the older gas engineer, who must later look for his assistants among the young men who are studying to-day in our various technical schools and colleges.

No one who thinks, and observes, can dispute the fact that there is something lacking in the present-day methods of training engineers. Mr. Aldred styles it "practicality." In the opinion of this journal the young graduate engineer lacks more than this. One thing he too often lacks is tact. Another is an ability to handle men. A third is the necessary confidence in himself not to hesitate to learn from those whom destiny and opportunity have placed in a lower post than the one he is given immediately after graduation.

This last point is a most important one. Undoubtedly it does take an engineer to effect the big improvements. But quite often the grimy foreman will be able to suggest the way, or drop the hint that may lead to great things.

There are other elements, too, that the young graduate lacks. The discovering of them, and providing the remedy, undoubtedly is the responsibility of the professors, but let not the older gas engineer sit back in complacent ease waiting for them to discharge their obligation.

While the responsibility undoubtedly is theirs, the interest served is that of the established gas engineer, who, as has been stated, must find his future assistants in these same young men, and that of the gas industry, which will progress or stagnate, according to the calibre and training of the young men who engage in it as their life's work.

## Duplicating Inspections

An interesting, though distressing, condition is revealed in the report on the suit of the New York Department of Water Supply, Gas & Electricity, to enjoin the Woodhaven Gas Company from laying mains without the permission of that department, which was published in the Items of Interest from Various Localities pages of last week's issue of this journal.

It appears that both the Borough President of Queens and the commissioner of the municipal utility department desire to place inspectors on the work,—at the expense of the gas company—and that, not satisfied with this, the commissioner has charged the company for the whole time of another inspector whose entire duty, apparently, was to watch the inspector already placed.

Such occurrences, unfortunately, are, by no means, rare. Upon calm analysis it is difficult to conceive of any good reason why all the city's interests in the matter could not be looked after by one inspector. But this has not been, or is not, the case in many instances.

In New York the Borough President's inspector is sent to see to it that the backfilling is done according to the city's requirements, and to take care of the paving. The Water Supply, Gas & Electricity inspector is supposed to see to the actual laying of the mains and the making of service connections. There is no reason whatever why one man should not combine the two functions.

Perhaps the Borough President would not feel that the inspector from the other department would conscientiously look after the borough's interests, and the feelings of the Commissioner of Water Supply, Gas & Electricity might be of a somewhat similar nature, with respect to the borough inspector. Such, however, should not be the case. If the inspectors on the municipal payroll in any city do not possess an equal, or greater, loyalty to the city as a whole than to any individual department or bureau, it is about time that they be replaced by inspectors who will.

There is no logic in duplicating inspectors. The system as practiced is not only wasteful in money, but in human effort as well. Since it is the utilities who bear the expense of the waste, it is not likely that municipal officials will stir themselves very much to correct the abuse, unless some pressure is applied to arouse them. It is very much to the interest of the utilities—

not only the gas companies, but the electric companies, street railways, etc.—to apply that pressure.

The action of the Woodhaven Gas Light Company, in refusing to pay for services that were not rendered, is in every way commendable, and is in line with the suggestion offered in these columns, in the issue of July 10, under the heading, "For the Common Good." Though it lost its suit in the matter of the injunction, it has performed a distinct service to public utilities as a whole, and, in bringing to light the conditions cited, has perhaps paved the way to the correction of such abuses in the future.

## Co-operating with Educational Institutions

At their recent convention in Philadelphia the Advertising Clubs of the World passed the following resolution: "Henceforth to employ to the utmost the educational institutions of our land for searching out facts scientifically, exhaustively, fearlessly, and to sacrifice selfish advantage when conflicting with the fundamentals of truth."

Since, in the gas business, the commercial problem of building "good will" compares in greatness to the engineering problems of building gas works or distribution systems, that business is bound to benefit from any good that may result from this action.

Has gas engineering progressed as rapidly as it might have, had gas companies adopted such a resolution fifty years ago? If we divide the total of the improvements that have been made in the business, since the days of gun barrel service pipes, by the hundred years that have intervened, do they amount to as much as we might expect? Would it not have been better to have had the educational institutions of the nation devote more attention to our problems?

The present European War has emphasized the importance of the gas industry to the country in war time. This has caused some educational institutions, on their own account, to give more attention to our problems. It has been instrumental in starting research work along the line of gas works by-products. Would it not be good policy to have them help us solve more of our problems?

There is still much work to be done in the field of surface combustion; the improvements that have been made in gas lighting during the past fifteen years do not measure up as well as they should have to compete successfully with electric lighting; there is great promise of profit from high pressure distribution. These and many other problems would give our educational institutions considerable work to do. Why, then, can not the gas associations at their next convention adopt resolutions that they will employ the educational institutions for searching out facts; scientifically, exhaustively, and fearlessly even at the sacrifice of personal advantage?

## Compensation for Salesmen

The compensation of salesmen is always a live issue. When it is discussed, however, the discussion usually hinges on the method of paying. That is, the advantages and disadvantages of paying on a salary basis, a straight commission basis or a combination of the two are considered. Far too rarely does the argument go back to the outward form of the compensation.

In the final analysis, it is not the form of paying salesmen that really counts. It is only by guaranteeing to them the fruits of their labor that they can be satisfied and their loyalty aroused. It makes very little difference in what form salesmen receive their compensation if they think they are not getting a fair deal. Dissatisfied salesmen are likely to do far more harm than good. If a company cannot secure the good will of its salesforce it can hardly expect to secure the good will of the public with whom the salesmen come in contact.

A good test of any system is the following:

Does it pay the salesmen adequately for the work the company wishes them to do?

Does it guarantee the salesmen a future, thereby attracting young, energetic and ambitious men?

Is the system of promotion simple enough to make it easy for each man to satisfy himself about the progress he is making?

The great weakness of many straight commission systems of paying salesmen lies in the fact that the company desires the men to do work for which they receive no remuneration; that the work the salesmen find the most profitable may not be the kind of work the company desires them to devote most of their time to, and that no future through promotion is provided for.

It is for these reasons that it is very difficult to secure the right type of men. The salary system covers up these defects to a considerable degree. Either system, however, or a combination of both will be sure to fail if the salesmen are not made to feel that they are sure that they will secure absolute justice from the company and that honest effort will be rewarded by promotion to a more responsible and a more remunerative position.

The selling problem is coming to be more and more important. Competition is growing keener and keener. The cost of electricity is rapidly being reduced and is constantly approaching the cost of gas. It will not be much longer that gas can be sold on the question of price alone. Soon it will require just as high a degree of salesmanship to sell gas as to sell electricity. This means that better trained and better educated men will have to be brought into the field.

To attract these men they will have to be paid adequately and justly. A good future will also have to be assured. The positions will have to be made permanent and actual promotions as well as promises of promotion will have to be made from the sales department. It is only by so doing that a strong permanent sales force can be built up. If this is not done the form of compensation matters little. Unless the form is backed up by absolute honesty and justice ultimate failure is assured.

## Opportunities in Outlying Sections

In many cities of large size very little opportunity of materially increasing their send-out for domestic uses will be afforded gas companies within the next generation. Some of these cities have simply stopped growing and in others the bulk of the population has already been converted to gas. Great opportunities, however, do exist in outlying sections and towns, for many companies. Extensions to high pressure lines will provide the means of taking advantage of them.

Somewhere in Connecticut there is, within eight miles distance from the farthermost main, two towns aggregating in population almost 2,000 people. All along the way is a string of dwellings that is every year becoming more closely compacted.

The most distant town is a small manufacturing center. There are a number of mills already using electric power. The others depend on water power with unsatisfactory results, and will—if no other means of driving their machinery is offered—soon adopt electricity. The cost of coal is very high, partly on account of the distance from the coal regions, high freight rates, etc., and also because of the primitive methods of unloading, storing and handling that are in use.

The rates for electric power were, up to a short time ago, 15 cents a kilowatt hour. Recently, this journal understands, they have been slightly reduced.

An added advantage in this case is that the towns are entirely dependent on overland transportation to get their coal in, while the gas company that might supply them is so located that it can get its coal in barges.

What a wonderful opportunity there is here for gas, and in how many parts of the country are equally good opportunities presented!

Most gas plants are designed to capacities at least 25 per cent greater than their regular send-out. There is no real hope, in many cases, that before they become antiquated the city demand will grow up to the difference. To reach out into the nearby towns would entail only the expense of extending mains. The present overhead, at the most, would be increased but slightly. There would be opened up a virgin field for the sale of appliances and fixtures. The profit on this particular send-out, if only the direct charges of the new services are considered, instead of their proportionate part of the whole, would be enormous.

This journal has good reason to believe that the two towns mentioned will be supplied with gas in the near future; that the company which can supply them has awakened to its opportunities in the outlying sections. But how many similar opportunities are literally staring other gas companies in the face to-day that are not even thought of!

# Future of Gas Seems to Lie Less in Its Use as an Illuminant Than as a Fuel

**Gas Manufacturers Instead of Worrying About Electric Light as a Competitor Should Look Ahead—Industry is Just at Very Beginning of Better Things**

The gas industry is just at the very beginning of better things. Its by-products are vital to the country in peace or in war, and their value is constantly increasing. Gas manufacturers, instead of worrying about the competition of the electric light with gas illumination, should look ahead. The future success of their product lies less in its use as an illuminant than as a fuel; is less a question of candle power than of heat units. Systematic education of the public is a necessity. The future gas-producing plants will be at points rather removed from the zones of consumption in the cities, and the product will be conveyed under high pressure in smaller pipes to the point of consumption. These beliefs were expressed by Dr. L. H. Baekeland, formerly president of the American Electro Chemical Society of New York, at a meeting held in Baltimore, June 16, in commemoration of the American Gas Centenary. The following has been abstracted from Dr. Baekeland's paper:

### Coal Tar Merely a Nuisance in Early Days of Gas Manufacture

The men who started the first gas company probably foresaw no other possible result of their enterprise, than a more convenient way of illumination which would add to the comforts of the community by doing away with the old methods of candles and oil lamps, and which would permit to obtain good interest on money invested.

These initial motives, by which most new industrial enterprises are started, have in more than one instance, led to consequences never contemplated at the beginning. In this case, the originators certainly never imagined what ramified undreamt-of developments this simple process of making gas by the distillation of coal, was going to bring forth. As one of the complications in the technicalities of gas-making, there was that bothersome by-product coal-tar, or gas-tar, which condensed from the gaseous products, emitted by the retorts in which the coal was heated. This so-called by-product was nothing more or less than a nuisance. It smelled bad, it was sticky and was hard to dispose of or to bury in the ground.

But it so happened that inquisitive chemists, in their laboratory investigations, began to examine the composition of this coal-tar, merely from the standpoint of the "why" and the "wherefore." They submitted it to fractional distillation and succeeded in isolating from this complex liquid many new products which existed all mixed in coal-tar. At the end of the operation, they found in the distilling flask a black, resinous mass, known as pitch.

Among the volatile products which distilled over, they separated benzol and toluol, and some other liquids which evaporate easily and which smell and look like gasoline.

Then there was another volatile product, but which solidifies when it cools and is white and crystalline, and which was called naphthaline. It is better known in this country under the name of "moth balls," or "moth camphor."

Some other crystalline bodies distilled over, as for instance, a substance less popularly known and called anthracene, which has quite some importance in the artificial dye industry.

### Creosote Oil Extracted

Then there was that liquid called creosote oil, which is used now for impregnating our railroad ties and for the preservation of wood. They also extracted from coal-tar other substances like phenol, or carbolic acid, used as an antiseptic in surgery and medicine to heal and to cure, but used more to-day to maim and kill, since it was found that by treating carbolic acid with nitric acid, it can readily be transformed into that fearful explosive, picric acid.

These are merely a few of the substances which have thus been isolated from coal-tar. Since the time of their discovery the diligent work of research chemists has enabled us to use every one of these substances as a starting point for building up a literally endless amount of complex chemical bodies.

This is not done by merely mixing or compounding, as some people may imagine, but by changing the very nature of their smallest particles or molecules into new chemical individuals which never had existed before, and which are not merely mixtures, no more than a living human being is a mixture of blood, flesh and bones.

The way the chemist uses these substances extracted from coal-tar in his synthetic or building-up processes, may, to a certain extent, be compared to the methods of a skillful architect who uses bricks and stones to build up the most diversified monuments of architecture. In the case of the architect, the bricks and stones would represent the atoms, while the mortar or cement corresponds to the chemical affinity which holds and groups the chemical atoms together in the most complicated molecular structures.

### Work of Kekule

There existed a certain chemist—Kekule was his name—a man distinguished as much by his personality as by his unusual brain. After leaving his native Germany, he went to live in London, where he worked with Hoffmann, in company with a group of many other ardent scientific investigators; a group which at that time added much to the scientific renown of England's capital. Later on, after his work began to make him known, he was called to the University of Ghent, in Belgium, where for many years he was professor of chemistry, and where he spent the period of greatest activity of his life, until later, unusual inducements were offered to him by the German government to accept the professorship of chemistry at the University of Bonn, where he remained until he died.

Kekule took special interest in benzol. It had been established that this liquid was not merely a mixture of several substances, but it was what is called in chemistry a chemical individual, a substance of which every particle, every molecule, has the same chemical constitution.

To the average mind, such a liquid would hardly be of much interest beyond the fact that its combustibility might be turned to profit for heating or illumination, or that its solvent powers for oily matters might come into good use for removing grease-spots from soiled clothing, or similar purposes.

For a scientist, however, the reason of interest has quite broader considerations. Kekule and his fellow-workers manipulated and tortured benzol in every possible way, alone or in presence of different chemicals, under different conditions, so as to study its behavior and to change it into other chemical products.

Several new derivatives were thus brought to light. There were, however, several particularities in the chemical behavior of benzol which could not be explained easily; to solve this puzzle was the great ambition of Kekule.

He was so fascinated with his subject that it never seems to have left his mind at that time. At any rate, it is told that one day, while riding on an omnibus in London, seated among his fellow-passengers, he conceived an ingenious theory, which would endeavor to explain the chemical constitution of the molecule of benzol.

He concluded that the relation of the 6 atoms of carbon with the 6 atoms of hydrogen, which enter into the constitution of the molecule, can best be explained by admitting that they are grouped among themselves in such a way as if they were linked together by the attraction of chemical affinity so as to make some kind of a ring—a hexagonal ring, where all the six atoms of carbon are tied together, while each one of them is connected with an atom of hydrogen.

### Vision Adds New Phase to Gas Industry

This mere vision of an advanced thinker was destined not only to add an entirely new phase to the gas industry, but was to become the starting point of a new synthetic chemistry, amazing in its daring and its results, and which was to make of chemistry a truly creative science; was going to unite in stronger bonds theory and engineering, science and business, money and idealism, make them all partners and create new scientific industries which even to-day have no parallel, except perhaps in the development of the application of that branch of physics which is called electrical engineering.

The industry of the coal-tar derivatives made of chemistry, more than ever before, the first science which began to talk that universal language which the average man can best understand—the language of dividends—the capitalists' esperanto.

### Coal-Tar Became a Main Product

Coal-tar, at first a by-product of gas manufacturing, became a main product. Gas companies could not produce enough of it, so the coke-oven systems, which furnish coke for the iron and steel industry, had to be modified until a modern by-product coke-oven plant becomes practically a gas plant, where gas is the by-product and too frequently goes to waste, while coke and tar are the main products.

Just now, if the United States wants to be logical in its program of military and industrial preparedness, it must take into paramount consideration the by-products of gas and coke ovens. Benzol, toluol, naphthaline and carbolic acid are all used in staggering quantities for the manufacture of explosives. Ammonia is another important by-product of the gas and coke industries. It is used more than ever just now in Germany, where ammonia fertilizer is the main hope of larger crops and bread, which at present seem to be more scarce there than explosives.

Even directly as an explosive, ammonia is used to a large extent as nitrate of ammonium. It is used also for refrigerating machines for keeping food supplies in cold storage, as well as for endless other industrial purposes.

### All the By-Products of Gas-Tar Needed to Build Up Aniline Industry

We need all these by-products of gas-tar for building up a national aniline dye industry, which will prevent foreign countries from remaining our dictators on what conditions our textile manufacturers and other industries shall or shall not have the necessary supply of indispensable dyes. But we need a well developed coal-tar dye industry just as much as an indispensable means, always ready in case of war, of transforming the chemical establishments in which dyes are manufactured into efficient units for the immediate manufacture of all the needed explosives. This seems to be the best way to carry the problem out promptly without incurring the perilous delays through which the allies have had to pass.

What more holds the future of the gas industry? To me, it seems as if we were just at the very beginning of greater possibilities. Gas manufacturers, instead of worrying about the competition of electric light with gas illumination, should look ahead. The future success of gas seems to lie less in its use as an illuminant than as a fuel; seems to be less a question of candle power than of heat units. There, I believe, is where good systematic education of the public is necessary; as far as I know, few gas companies have done anything in that direction.

Since the advent of the Welsbach incandescent light, the specifications of our municipal gas franchises have become hopelessly antiquated through sheer ignorance of the facts. The public is the loser by it, because the gas companies have to make their gas by processes which are needlessly expensive, and which make it impossible to give the public the benefit of the lower price of cheaper processes where gas is sold by heat-unit specifications, instead of by candle power.

### Gas Plants in Future Will Be Located Apart from Centers of Population

As soon as this is obviated, it seems that as a logical consequence, our future gas-producing plants will be located at points rather removed from the zones of consumption in our cities as it will be found more advantageous to manufacture at centers where coal is unusually cheap, probably near the mines, and to convey gas under high pressure, in smaller pipes.

This cannot be done now because the gas, in order to conform to the specifications for candle power, contains too many products which liquefy and separate under pressure. But for this objection, the transportation of gas should not be more difficult than, for instance, transporting oil from Pennsylvania to New York in pipe lines. In this way, the gas companies might avail themselves of cheaper coal, unfit for domestic or factory use, but which could be utilized in a specially devised equipment.

This would permit the abandonment of the present barbarous practice of transporting and handling coal and ashes in our cities, as soon as every house and factory could be piped with cheap fuel gas, similarly as natural gas is used now in some favored localities.

### The Chemical Point of View

Then there is another point of view from the chemical side. Why should we burn all of the valuable products now contained in gas? I foresee the time when the gas of the future will be deprived carefully of any of the products which are more valuable for other purposes than for the mere value of their heat units, just in the same way as benzol or toluol are now carefully removed.

It seems possible that the time may come when some other substances, contained in gas, as for instance ethylene gas, will be used in combination with chlorine-gas, so as to make ethylene-chlorid, which could find endless uses as a cheap solvent in the extraction of oils from animal or vegetable products, not to speak of the well demonstrated possibility of transforming ethylene into alcohol by combining it first with sulphuric acid.

Practical business men may see in all this merely theoretical dreams. May I be permitted, however, to remind them that these dreams are no more risky than that of Kekule while he was sitting on that London omnibus; on that day his coach-driver could never have guessed that these dreams were the most precious load he had aboard his horse-drawn vehicle.

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## Meter Reading Charge Upheld in Pennsylvania

When clearly set forth in the tariff schedules published by a gas company, minimum charges for meter readings are not objectionable in themselves, the Pennsylvania Public Service Commission ruled, in an opinion handed down, July 22, in the case of C. L. Anton against the Citizens' Gas Company of Monongahela City.

Anton in his complaint objected to the minimum charge and to the fact that the price of gas had been increased. Commissioner Brecht, who wrote the opinion, called attention to the fact that the complainant presented no testimony regarding whether or not the price charged was excessive. This charge was one dollar and was justified by the company on the ground that it was a reasonable "ready to serve" rate, the theory being that it costs a gas company money to be ready at all hours to furnish gas to customers even though the patrons may make no use of the gas.

In dismissing the complaint the Commission orders the gas company to file, post and publish in accordance with law an amendment or supplement to its tariffs so as to make its rules comply plainly with its actual practices as to the time and frequency of the reading of meters, said amendment to take effect before Sept. 1.

Commissioner Brecht said in the course of the opinion:

"The Complainant, a resident and property owner of Monongahela City, Washington County, Pennsylvania, has been a user of gas furnished by respondent for a period upwards of 14 years. In a complaint filed with this Commission on March 2, the said complainant alleges that on Dec. 1, 1915, the respondent increased its rate for gas and raised the minimum rate to one dollar for meter reading when gas was not in use or otherwise. In the month of January, complainant did not use over a thousand feet of gas as shown by the meter, and that when he 'offered to pay for all gas used' he was told payment would not be accepted unless he paid the minimum charge. On Feb. 16, because complainant refused to pay the rate as fixed by respondent, gas was shut off from the premises of said complainant and his service discontinued.

"The averments of the complainant are admitted by respondent to be substantially correct. In its answer the respondent sets forth that the charge of one dollar for each meter reading is a service charge and is in accordance with its schedule of rates filed with the Public Service Commission.

"There is nothing in the record to show that complainant attempted to prove any unjust features in respondent's method of applying the minimum charge, or in the present published rate per thousand cubic feet of gas consumed. The complainant objects to the increase in rates made in January, but offers no testimony other than his own opinion to show that the rates now charged are unjust in themselves, or that they are unjust and excessive by comparison with rates charged for gas in other places under substantially similar circumstances and conditions.

"Witness for respondent testified that the increase in rates was made because of an advance of 4 cents per thousand cubic feet in the wholesale cost of gas to respondent company; that the minimum charge of one dollar for each reading of a meter is a service charge intended to cover the running expenses of the company, and the expenses of giving service to patrons through meters; that the minimum charge is made for only nine readings in a year; that all consumers are supplied through meters, but the gas company does not furnish the meters, nor place any restrictions upon the size of the meter installed.

"The Commission is of the opinion that the complaint must be denied in the absence of any testimony showing the unreasonableness of the rates, but that the rules or by-laws of the gas company should be amended so as to comply plainly with the actual practices of the respondent as to the time and frequency of reading the meters. An order will be issued to that effect."

## American Industrial Commission will go to France in August

An American industrial commission, composed of a dozen to twenty men of national reputation, is to go to France in August. Its object is, primarily, to make a technical investigation of present conditions in that country looking to the reconstruction and reorganization of her communities and industries, which will take place now and after the war, to determine the manner in which the United States may contribute, and to arrange for largely increased purchases of French products.

The undertaking is based upon proposals which came unsolicited to the American Manufacturers Export Association. Extraordinary facilities have been granted by the French government to aid the commission, and an account of its visit will be published for general distribution under the authority of the association.

It is intended to include in the representation all the industries of the United States concerned in French trade under the following classifications:

Prime movers: (Steam, gas and oil engines; pumping engines, steam and hydraulic turbines, condensers, generators and all other adjuncts.) Heavy machinery: (Rolling mills, iron and steel products, etc.)

Machine-tools, wire, transmission and textile machinery.

Milling machinery: (Flour and saw mills; cement, mining, smelting, agricultural and road machinery.)

Electrical apparatus.

Transportation: (Locomotives, cars, naval vessels, etc.)

Importers: (Textiles, including laces; dry-goods of all kinds; porcelains, groceries and wines; toys.)

Synthetic products based on chemical processes; chemicals, explosives, etc.

Bankers.

Factory architects, engineers and contractors.

W. W. Nichols, of the Allis Chalmers Manufacturing Company, is chairman of the commission. The itinerary, with transportation throughout France provided by the government, includes visits to the following cities: Bordeaux, Limoges, Aubusson, Le Mont-Dore, Clermont-Ferrand, Vichy, St. Etienne, St. Chamond, Lyon, Arles, Marseilles, Grenoble, Chambery, Aix-Les-Bains, Annecy, Chamonix, Evian, Nantua, Oyonnax, St. Claude, Morez, Malbuisson, Besançon, Montbeliard, and Belfort.

## Wood-Waste Produces Gas of Slightly Less Calorific Value than Coal

F. A. Rasch, gas expert for the Oregon Public Service Commission, recently inspected a model of a proposed plant at La Grande for utilizing wood waste to produce gas. He stated that the model produced a large amount of gas of heat values slightly below the values obtained from coal, but of extremely low cost of production. He will tabulate his calorimeter tests, and make a report to the corporation commissioner for guidance in recognizing the promoters of the venture.

# Publications

**Proceedings: Southern Gas Association; Eighth Annual Meeting:** 154 pages: Contains names and addresses of old and new officers; names, occupations and addresses of members, and papers and discussions at meeting.

**Engineering in Foreign Fields:** Booklet issued by the J. G. White Companies: Points out different position United States has attained in affairs of the world during the last two years, and pictures some of the works of the White Companies underway in foreign countries.

**Sensitivity and Magnetic Shielding Tests of a Thomson Galvanometer for Use in Radiometry:** No. 282; Scientific Papers of the U. S. Bureau of Standards: Describes an investigation made to improve the sensitivity and design of a specialized galvanometer for use in radiometry. By using a lighter suspension in a vacuum, the sensitivity was increased tentold. The results will be of great value in the study of stellar radiation since the recent advances in this field called for the increased sensitivity which has been now obtained. The paper gives details as to construction and results of tests.

**The Beighlee Compensated System:** Illustrated booklet issued by the Beighlee Electro Company of Cleveland: Indicates universal need for a high grade pyrometer and describes operating principle of thermo-electric pyrometers: Tells how Beighlee Compensated System overcomes common pyrometer errors and points out other noteworthy features.

**Hydro Volume and Pressure Recorders:** Booklet issued by the Bacharach Industrial Instrument Company of Pittsburgh. Describes "Hydro" volume meters and their uses in connection with other velocity-measuring devices.

**Thwing Recording Pyrometers:** Booklet issued by the Thwing Instrument Company, 445 North Street, Philadelphia, Pa. Describes Two-Galvanometer Six-Record Recorders.

**The Foxboro Company, of Foxboro, Mass.: Catalog:** Describes the Tapalog Multi-Record, Multi-Color Pyrometer Recorder, the company's pyrometer switches, Foxboro portable tachometers and accessories, Durant radial planimeters, electric pyrometers, platinum-rhodium thermocouples and other products.

**Vulcan Soot Cleaners:** Booklet issued by the Vulcan Soot Cleaner Company of Du Bois, Pa. Describes the company's cleaners and discusses soot; what it really is and how it is deposited. An interesting booklet, well illustrated and attractively gotten up. Well worth the time it would take the gas engineer to read through it.

## City Pays for Altering Gas-Main Location in Toronto

In the building of a sewer by the Toronto City Corporation a gas main belonging to the gas company had to be changed. The main was lowered by the company, and the corporation paid the cost of the work under protest.

An action was then brought by the corporation against the company to recover the amount so paid, in order to determine the question of liability.

The Supreme Court of Ontario decided in favor of the gas company. The judgment was based on the decision of the Supreme Court of Canada in the case of Consumers' Gas Company *v.* Toronto, in which case it was decided that for rating purposes the company's gas mains in the public highways were "land," taken and held by them under the provision of their Act of Incorporation. Accepting such decision, the court held that such "land" had been injuriously affected by the operations of the corporation and that the corporation was liable to compensate the company for such injurious affection under the provisions of section 325 of the Municipal Act, 1913, and that the cost of moving the gas main was the measure of compensation.

# Items of Interest from Various Localities.

## Free Power Requirement May Bar Gas Company from Bidding for Salt Lake City Lighting

The discovery by the city attorney of Salt Lake City that under the franchises of the Utah Power & Light Company, the free light and power received by the city is contingent upon its receiving the contract for street lighting, has opened a new phase in the street lighting matter that has given rise to further complications.

The city tentatively decided that it would give the Utah Gas & Coke Company and the Welsbach Street Lighting Company the privilege of bidding on street lighting, but that it would compel the same requirements as to free light and power as have been imposed upon the electric company.

The electric company is supplying free light for the city's municipal buildings and grounds, twenty-five arc lights free and 62½ horsepower of power current free for elevator and the use of other machinery.

But the attorney found that this free light and power is contingent upon the electric company having the contract for street lighting. Hence he advised the commission that the only fair manner of competition would be to require the gas companies, if they bid in opposition to the electric company, to make an offer of at least an equal amount of free light and power.

This phase of the matter was presented to C. W. Eyman of the Utah Gas & Coke Company and R. W. Bingham of the Welsbach Company for consideration and advice to the commission later as to what their companies would do.

## Muskegon Heights, Mich., to Get Gas by Aug. 1

A. E. Hopperstead, manager of the Muskegon Heights Gas Company, has promised Muskegon Heights, Mich., citizens that the plant which is at present being built in the eastern portion of the city by his company will be in operation and ready to give out the first gas on Aug. 1. The entire city has been mained and houses have been piped for cooking and lighting gas, and the prospects are that the new company will do well from the start.

At the present time the company has over 400 subscribers and most of their houses have already been piped and are ready to use the gas as soon as the company starts manufacturing it.

## Gas Company Employees Given Service Badges

Fifty-eight employees of the Pacific Gas & Electric Company stationed at the Potrero gas works were decorated with service badges yesterday by E. C. Jones, chief engineer of the gas department. These service badges are given, under a plan recently put into operation by General Manager Britton, to all employees, who can boast of ten years or more continuous service with the company. Altogether there are 532 names on the "Pacific Service" roll of honor at the present time.

## Seeking Gas Thieves at Springfield, Mo.

With a view of ascertaining if there are any users of gas in Springfield who are securing a part of the supply by passing it into the burners before it is measured by the meters, a number of experts have been assigned to make a special investigation of the gas meters in the city. The investigation will be for a general test of meters and especially to ascertain if any irregularities exist.

The investigation is a result of the discovery by gas company employees of a few instances where gas was being conducted into the residences without first having passed through meters. It is believed that very few such cases will be found on account of the difficulty and danger incident to the manipulation of the gas pipes. Two arrests have been made as a result of the alleged illegal use of gas in this manner.

## Heavy Demand for Coke in Massachusetts

The Massachusetts Gas Companies are experiencing an unprecedented demand for coke as the result of the high price for coal. Although coke prices are $1 a ton higher than a year ago, there is no let-up in the orders, and the demand far exceeds the supply.

The New England Gas & Coke Company handles the coke business of the Massachusetts Gas Companies and last month showed the largest June profits in the history of the company; namely, $78,098, which was more than double the profits for corresponding month in the previous year.

## Oppose Installation of Automatic Devices to Shut Off Gas in St. Louis

Real estate men's opposition to a bill requiring the installation of automatic devices for shutting off gas in business buildings, apartments and hotels in St. Louis, probably will, it is expected, cause the defeat of the measure in the Board of Aldermen.

Chairman Scholl of the Committee on Streets, Sewers & Wharves announced after a public hearing, July 17, that the bill would not be reported until next autumn.

Besides the objections of the Real Estate Exchange, represented by Warren McGinnis, those of the Laclede Gas Light Company were presented. Former Judges Jesse A. McDonald and Henry S. Caulfield appeared for the company and contended that the present system of checks, one within the building and another at the sidewalk, afforded ample protection against explosions.

It was asserted that the installation of the device on buildings coming within the provisions of the bill would cost $200,000. This expense, Warren McGinnis said, would have to be borne by the property owner.

## Brass Melting Furnace Burns 30,000 Cubic Feet of Gas Per Day

What is probably the largest single industrial gas appliance ever sold in the South was sold in Birmingham the latter part of April, 1916. It was a 5,000-lb. capacity brass melting furnace installed for the Anderson Brass Works.

This company makes a specialty of large brass castings for sugar mill machinery and other purposes. Very frequently it is necessary to make castings weighing as much as 3,500 lbs. each. The furnace will be operated so as to secure approximately two runs per day, making it necessary to consume gas for about five hours, and the estimated gas consumption is approximately 6,000 cu. ft. per hour.

The Anderson Brass Works have received enough orders to keep their plant running the entire year of 1916 for sugar refineries in Cuba. This work will require solid brass castings weighing 12,000 lb. each, made in four sections of 3,000 lb. each. They propose to make a complete set of these plates, four in number, daily, with the new Monarch furnace they have installed, where it formerly required approximately two weeks to get out a casting of this size.

The castings are made in four sections for the purpose of handling, as the bulk would be too great in one piece for shipping.

The furnace sold is known as "The Monarch Reverberatory Furnace," and is manufactured by the Monarch Engineering Company, of Baltimore, Md.

This contract was secured after several months' effort by H. M. Watson, Gas Industrial Engineer, of the Southern Properties of the United Gas & Electric Engineering Corporation.

The rates charged for gas are as follows:

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|---|---|
| First 10M. cu. ft. | 95c |
| 10M to 20M. | 80c |
| 20M to 30M. | 75c |
| All over 30M. | 70c |

## An Excellent Example of Newspaper Misrepresentation

The following is an excellent example of how a hostile newspaper can purposely misrepresent facts and misconstrue the statements of intelligent men and make them appear ridiculous. It also reveals the calibre of the opposition to the Laclede Gaslight Company in its effort to obtain permission to manufacture heat unit gas in St. Louis. The item has been clipped from one of that city's newspapers:

"Public Utilities Director Hooke this afternoon reported that the new so-called dry process gas now being furnished by the Laclede Gaslight Co. has less candlepower efficiency than the 'wet' gas formerly in use.

"Under the company's franchise it is required to furnish gas which would show 18 candlepower to the cubic foot. Hooke's test of the old-style gas furnished in June showed 18.6 candlepower. Tests of the new gas made on July 13, 14 and 15 showed only 15.47 candlepower to the cubic foot. This is a 14 per cent decrease in candlepower efficiency. Hooke says it means a 10½ per cent advance in the price of gas to those who use gas for lighting in open jets. Four per cent of the Company's costumers are open jet users.

"The company alleges that the application of the heat unit standard will not decrease the efficiency of the gas for cooking and mantle lighting purposes."

The following item clipped from another local paper clearly sets forth Mr. Hooke's attitude:

"Director of Public Utilities Hooke told a reporter for *The Star* to-day that the British thermal unit, or heating tests, being conducted by his department of the new 'dry' gas now furnished by the Laclede Gas Light Company, shows an efficiency of 600 units to the cubic foot, or the same amount of heat units contained in the old, or 'wet' gas, formerly supplied by the company.

"Hooke explained that therefore St. Louis consumers of gas in mantle lighting, stoves, or general heating purposes, would receive gas which would do exactly the same work as the old gas, and at a 5-cent reduction in price. Hooke believes the change an excellent one for the city."

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## Gas Consumption for Fan Blast Confectioners' Furnace ½ Cent Per Hour.

The Improved Fan Blast Confectioners' Furnace, which is illustrated herewith costs but ½ cent per hour for fuel. Among the features of the appliance are said to be its great speed, convenience, simplicity, durability and economy. It consumes only 1.2 to 2.4 cu. ft. of gas per pound of candy cooked.

The furnaces have been designed by experienced candy men, co-operating with gas engineers. They are suitable for either artificial or natural gas.

They have double linings, which force the gas flame to follow the sides of the kettle clear to the top ring. This important and exclusive feature keeps the flame close to the kettle, and prevents the heat from going straight to the chimney.

The products of combustion pass over the top of the fire pot into a circular flue, from which there is an outlet to the chimney. This prevents loss of heat from the fire pot by radiation, because the furnace is insulated with its own flue gases. Furthermore, the opening at the top of the fire pot is largest on the side opposite the chimney connection. This makes the flame come up evenly around all sides of the kettle, instead of allowing it to be drawn to the side where the chimney connection is located. The shape of the fire pot is such as to reflect the heat of the flame against the kettle. The outside furnace jacket is of heavy gauge steel, and is lined with a special asbestos preparation.

The principles of design not only save gas, but they add a great deal to the comfort of the candy maker, by keeping down the radiation of heat into the room. They have extremely powerful gas burners which operate perfectly, whether turned high or low and whether the kettle is on the furnace or not. They are guaranteed to give no trouble by blowing out when the kettle is removed.

A pilot light, which may be allowed to burn all day at a cost of a few cents, supplies means of instantly lighting the burner, whether the kettle is on or off the furnace. The pilot has an adjusting screw. This pilot is not put out by the air blast when the main gas valve is shut and consequently the furnace is always ready for immediate use.

A flue connection is provided for on all furnaces. An elbow and one length of pipe, to which a special canopy is attached, is supplied. The flue pipe should always be connected and used whether attached to chimney or not.

The patented removable concave rings make the furnace adaptable to kettles of all sizes. Their object is to hold a small kettle close to the flame, so that the same economy will be obtained as with a large kettle. With the ordinary flat rings a small kettle would be high above the burners and an extravagant use of gas would be the result. No more rings should be used than are absolutely necessary, so that the maximum surface of the kettle is exposed to the flame.

The furnaces are manufactured by the Improved Appliance Company, 455 Kent Avenue, Brooklyn, N. Y.

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## Gas Company Has Installed 4,500 Sections of Gas-Steam Radiations During Past Two Years

The Tampa (Fla.) Gas Company, during the past two years, has installed over 4,500 sections of gas-steam radiations. In some cases a single installation has run as high as $1,500 or $2,000. Over 75 per cent of this business was secured and installed during the summer months. An advantage for making heating installations in the summer is that most Southern gas companies find their distribution shop and sales department showing less profit on gas appliances at that season than in the winter months. Large installations of gas-steam radiation carrying a profit of 20 per cent over all make a very creditable showing during this dull period.

Most large public buildings have their construction started during the summer months, and it is in this class of buildings that the most profitable installations from a standpoint of appliance profit and gas consumption can be expected.

School buildings are particularly well adapted to this form of heating owing to the great difference in temperature that prevails in most schools between the north and south side rooms.

A constant complaint found in schools heated with the usual type of hot air furnace is that when the coldest rooms are comfortably heated the others are over heated. This means a huge waste of fuel. The flexibility of gas heating does away with this trouble.

### Requires Gas Companies to Set Aside Funds to Guarantee Possible Rebates

Justice Peter A. Hendrick in the Supreme Court, Borough of Manhattan, New York City, has granted the application of the Public Service Commission for the First District for the segregation of an amount equal to the difference between the old and new rates, pending a decision by the courts as to whether a recent order of the commission reducing gas rates of four companies operating in Queens is to stand.

The commission recently directed the Newtown Gas Company to reduce its rate from $1 to 85 cents per 1,000 cu. ft., and directed the Woodhaven Gas Light Company, the Richmond Hill and Queens Gas Light Company, and the Jamaica Gas Light Company, which also maintain a $1 rate, to reduce it to 95 cents per 1,000 cu. ft.

## Societies and Associations

THE AMERICAN GAS INSTITUTE Directors held their seventh meeting in New York City, July 20. Action was taken on the following matters: A motion was made and carried that the representation of the American Gas Institute in the National Fire Protective Association be increased to five members, the membership to be selected geographically, so that it will be possible for at least one member of the Institute to be present at each annual meeting of the National Fire Protective Association. A communication from the National Chamber of Commerce, requesting the Institute to become a member was considered, and motion carried to lay the same on the table. The report of the Technical Committee was read by D. D. Barnum, chairman of the committee. J. B. Klumpp, secretary of the Public Relations Committee, read the report of his committee. E. G. Cowdery reviewed for the directors the arrangements to date covering the entertainment features of the coming Convention in Chicago. He advised that Wm. J. Calhoun, Frank Lowden, Samuel Insull, and J. Hamilton Lewis had been secured as speakers for the banquet, and that every effort was being made to make the occasion a memorable one in Institute affairs. The handling of the Registration Bureau and distribution of papers is being worked out with a view to conducting these features with the greatest convenience to the membership attending. Further report of the progress of arrangements for the Convention will be submitted from time to time for publication in the News for the information of the membership.

THE GAS & ELECTRIC ASSOCIATION OF SPRINGFIELD, MASS., held its annual clam-bake at Eagleville, July 17. The affair, which was in charge of Fred A. Compton, president of the association, was a most decided success. The bake was composed of clams, oysters, lobsters, quahaugs, mackerels and potatoes, which were accompanied with generous supplies of tonic and watermelon. After the dinner other sports were enjoyed, and the party returned home at sunset. The invited guests of the occasion were Paul B. Webber, general manager of the Athol Gas & Electric Company, and the Gardner Gas, Fuel & Light Company, N. B. Webber, his assistant, E. E. Coffin, sales agent of the General Electric Company, and R. P. Benedict, manager of the Chicopee Electric Light Company.

THE BROCKTON (MASS.) GAS LIGHT COMPANY Employees held their annual outing July 22. Ninety members attended the dinner at Brant Rock. The trip was made in motor trucks.

THE MERIDEN (CONN.) GAS LIGHT COMPANY Employees held an outing at Savin Rock, July 22.

## Personal Notes

RUDOLPH P. MILLER, former Superintendent of the Bureau of Buildings, Borough of Manhattan, New York City, has been appointed chairman of the newly created Board of Standards and Appeals, which will have jurisdiction over all building operations in all the five boroughs of the city, instead of the control being separate for each borough. The new board has but two salaried members,—the chairman, and Daniel Sullivan, secretary. Mr. Miller's salary is $7,500 per annum and the secretary's, $3,600. Other members of the board are L. C. Holden, architect; William Crawford, building contractor; Howard C. Baird of the firm of Boller, Hodge & Baird, consulting engineers; A. R. Kirkus, a real estate expert, and A. J. Boulton, a Brooklyn labor representative, who receives $10 a day whenever the Board convenes.

LEO VALENTINE has been appointed local manager for the Ohio Gas & Electric Company at Franklin, Ohio.

WILLIAM J. STALLMAN, formerly connected with the City Engineering Department of the City of Rochester, has been appointed to a position on the engineering staff of the Rochester (N. Y.) Railway & Light Company.

ROSS R. MILLIMAN has been appointed to a position on the engineering staff of the Rochester (N. Y.) Railway & Light Company.

H. O. STEWART, of the industrial sales department of the Rochester (N. Y.) Railway & Light Company, was elected secretary and treasurer of the Rochester Engineering Society at its recent annual meeting.

WILLIAM YORKEY has been appointed to a position on the engineering staff of the Rochester (N. Y.) Railway & Light Company.

HENRY B. REED, formerly connected with the Long Island Railroad, has been appointed to a position on the engineering staff of the Rochester Railway & Light Company of Rochester, N. Y.

WILLIAM B. DENNIS of the engineering department of the Rochester (N. Y.) Railway & Light Company delivered an address to the Rochester Society of Technical Draftsmen, on his experiences in Siberia just after the European war started. He spent three years in Siberia building railroads for a London engineering company. When war was declared he and his wife were ordered to leave without re-entering their house; they tramped 450 miles across country, they lived twenty-nine days in an igloo, they were captured by Von Hindenburg's army, they were tempest-tossed on a fishing smack in the Bay of Finland and finally stranded in Norway, and then forced to peel potatoes on a tramp steamer from there to Sicily and then to New York. In all, these thrilling and not pleasant experiences covered a period of over 15 months.

ALEX. ILIVEY, formerly assistant superintendent of the Wabash Gas Company, of Palestine, Ill., is now general superintendent of that company.

W. M. KEENAN, recently became agent for the East Ohio Gas Company, at Youngstown, Ohio.

E. C. ROSE, who for the past eleven years has been general superintendent of the Wabash Gas Company of Palestine, Ill., has resigned.

GEORGE H. HUBBARD, of Ypsilanti, Mich., has been appointed manager of the Citizens' Gas Company of Hannibal, Mo., succeeding F. A. Tippy.

F. A. TIPPY, formerly manager of the Citizens' Gas Company of Hannibal, Mo., will have charge of the gas plant at Greenville, Miss.

## Construction Notes

PHOENIX, ARIZ.—Objection has been presented to the city commission protesting against the calling of an election to determine whether or not the city shall build a municipal lighting and gas plant.

FORT SMITH, ARK.—Contract has been closed between the Fort Smith-Van Buren, Bridgeport and the Clear Creek Oil & Gas Company, under which the company gets a 10-year franchise right to use the bridge to carry two 6-in. gas mains across the river at Van Buren.

SAN LEANDRO, CAL.—The C. L. Best Gas Traction Company plans to build a new plant at this city. Estimated cost about $70,000.

VISALIA, CAL.—The Central California Gas Company will spend $50,000 in improvements of the Visalia generating station.

IDAHO FALLS, IDAHO.—Messrs. Wilcox & Doyle have secured 400 applications for the use of gas, and will begin construction of plant and distribution system in the near future.

MONROE, LA.:—Franchises have been granted to E. N. Florsheim and J. H. Trusdale, trustees for Hunter and McCormick of Shreveport, La., Louis Lock and the Morechita Oil & Gas Company, to install gas services in this city. In the case of the first firm, the terms agreed upon were that it drill 4 test wells in the vicinity of Monroe. If these fail to produce, the firm agrees to pipe it from the Caddo field. The other firms, in order to obtain their franchises, will have to comply with the same requirements.

ARLINGTON, MASS.—The Arlington Gas Light Company is laying a new 10-in. main from the Soldiers' Monument to Marathon Street.

STONEHAM, MASS.—The Malden & Melrose Gas Light Company has been granted permission to open streets for the purpose of laying mains and services in Pine Street, Gary Street, Isabella Street, Franklin Street and Pomeworth Street.

MIDDLEBORO, MASS.—A gas main is being extended about 3,000 feet at Myrtle Avenue, Clifford, Coombs, North and Center Streets.

POTTERSVILLE, MASS.—The Fall River Gas Company is engaged in laying mains from Reade Street, north on Prospect Street.

DULUTH, MINN.—Bids for constructing 6-in. water and 4-in. gas mains on Superior Street, from the existing mains in Forty-seventh Avenue, east to Fifty-eighth Avenue, east, were opened July 14 at the City Engineer's office. Simon Johnson, at $725, was the low bidder.

BILOXI, MISS.—The Gulf Cities Gas Company is preparing plans for the rebuilding of the gas plant and distribution system at Biloxi. It is expected that construction work will start within a few months. The estimated cost of the work and other work which will follow is between $50,000 and $60,000.

ST. JOSEPH, MO.—Property owners on Mitchell Avenue from Twenty-ninth to Thirty-sixth Street are agitating for a gas main in their street.

POUGHKEEPSIE, N. Y.—Citizens are agitating for an extension of gas mains in Innis Avenue.

WILLISTON, NO. DAK.—A franchise has been granted a corporation represented by N. G. Phillips to supply Williston with natural gas.

MUSKOGEE, OKLA.—The $350,000 gas pipe line bonds, the reprinting of which was authorized and the contract let more than a week ago, are not yet ready for the approval of the Attorney-General.

HARRISBURG, PA.—The Harrisburg, Pa., Gas Company has obtained permission to lay a pipe line under the walk of the Market Street bridge from Harrisburg to Cumberland County over the Susquehanna River, a distance of one mile, to supply gas to Cumberland County towns. Work on the extension will be started at once. The gas line which now only runs to Wormleysburg directly across the river from Harrisburg will be extended to Enola and West Fairview, a distance of five miles.

NORFOLK, VA.—The City Gas Company has let a contract for addition to plant to R. R. Richardson, Chamber of Commerce Building, Norfolk. Cost about $10,000.

RICHMOND, VA.—Pipe for mains to convey gas to North Richmond have been received, and it is expected the Municipal Gas Department will soon begin the work of laying them.

HUNTINGTON, W. VA.—The Huntington Development & Gas Company awarded contract for 20 mile pipe line from gas fields to this city at cost of $300,000.

MILETUS, W. VA.—A franchise has been granted the Victoria Oil Company, under which it will distribute gas in this city.

## Recent Patent Issues.

**Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.**

1,188,661: GAS LAMP.—Abraham Lazarson, Chicago, Ill., assignor to Samuel Stein, same place.

1,188,985: GAS BURNER.—Robert T. Parisen, Pittsburgh, Pa., assignor to Lawson Mfg. Co., same place.

1,189,017: GAS STOVE ATTACHMENT.—Edward Z. Trombley, St. Johnsbury, Vt.

1,189,146: GAS BURNER.—Howard Lyon, Gloucester City, N. J., assignor to Welsbach Light Co., same place.

1,189,300: METHOD OF DETERMINING TOTAL AVAILABLE HEAT of gaseous fuel. Harry F. Smith, Lexington, Ohio.

1,189,349: PRESSURE REGULATOR FOR GAS SYSTEMS.—Frank L. Cross, Detroit, Mich.

1,189,370: GAS IGNITING SYSTEM.—William Lowman, Silver Creek, Neb.

1,189,731: GAS BURNER.—Simeon F. Pierce, St. Paul, Minn.

1,189,994: GAS DEVICE.—Edward C. Obermeyer, Nessen City, Mich.

1,190,295: AUTOMATIC GAS LIGHTER.—Ben F. Keith, Belton, Tex., assignor of one-third to Thomas S. Lovette, same place.

1,190,660: CLUSTER BURNER for incandescent lamps.—James McKenna, Gloucester City, N. J., assignor to Welsbach Light Co., same place.

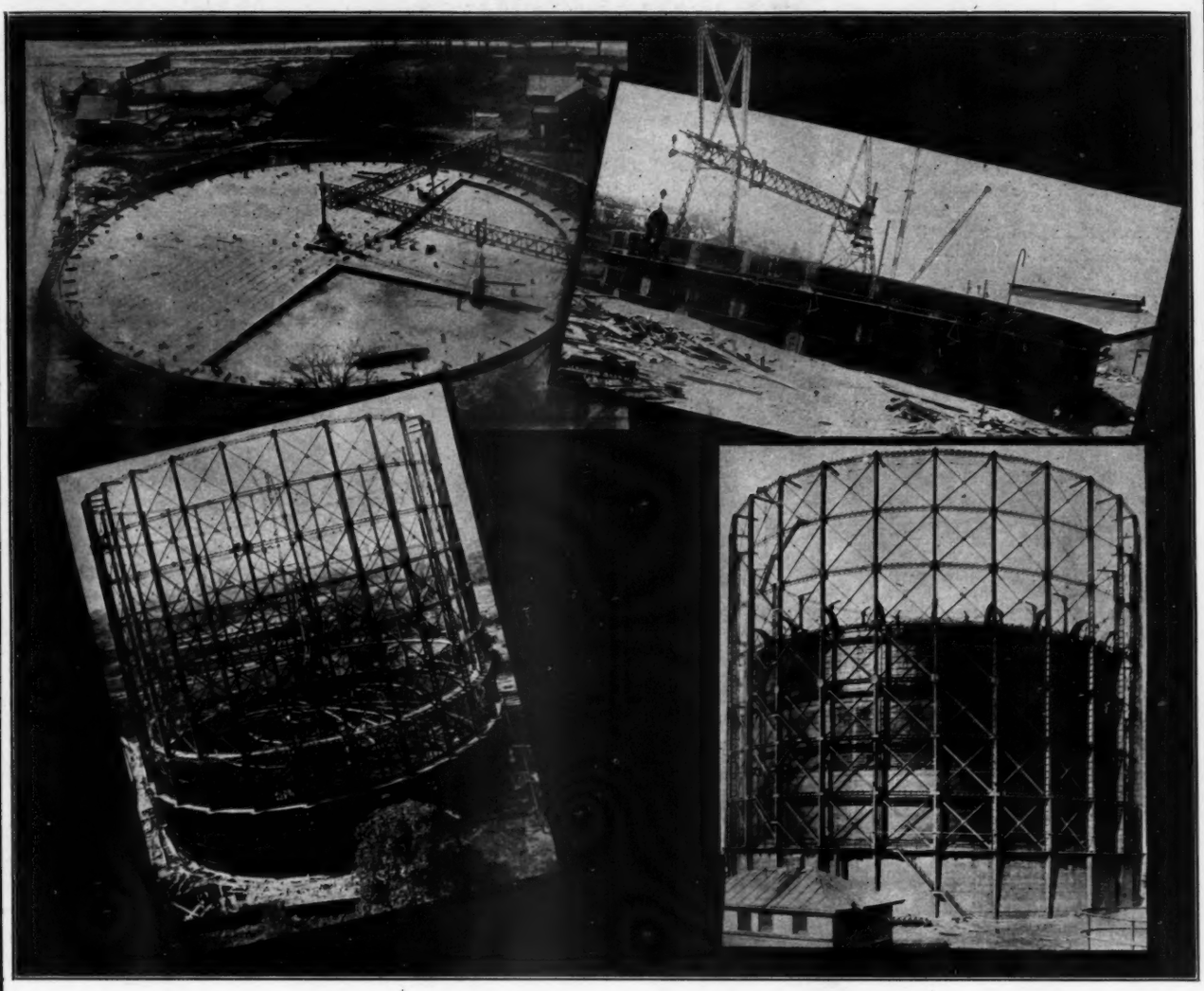
1,191,013: DEVICE FOR REMOVING ACCUMULATED LIQUID from gas mains.—Harry J. McGilvray, Weston, W. Va., assignor of one-half to Hunter M. Bennett, same place.

1,191,157: GAS METER.—Marshall Cornine, Mount Vernon, N. Y.

1,191,171: OPERATING MECHANISM FOR METERS.—Herman C. Fuhrman, Cedar Rapids, Iowa, assignor to The Tokheim Mfg. Co., same place.

1,191,270: HEADER FOR GAS METERS.—Edward Bartholomay and George A. Loeb, Jr., Rochester, N. Y.

1,191,503: METER ATTACHMENT FOR METER-BOX MOUNTING.—Edward H. Ford, Wabash, Ind.



RITER-CONLEY COMPANY

STEEL CONSTRUCTION

PITTSBURGH

HELME & McILHENNY

1339-1349 Cherry St., Philadelphia, Pa.

ESTAB. 1848 H & McI

GAS METERS

HINMAN DRUM STATION METERS, FOULIS GAS GOVERNORS
PREPAYMENT METERS

REPAIRING AND CONVERTING

PROMPT SHIPMENTS - - - - CORRESPONDENCE SOLICITED

# Financial Notes.

THE NORTHERN STATES POWER COMPANY reports an increase of 21.5% in net earnings for the month of June, 1916. Net for the year ended June 30th was 18.7% greater than for corresponding previous twelve months. Comparative figures are:

| Month of June | 1916 | 1915 | Increase | % Inc. |
|---|---|---|---|---|
| Gross Earnings | $436,913 | $369,879 | $ 67,034 | 18.1 |
| Net Earnings | 237,447 | 195,285 | 42,162 | 21.5 |
| Six Months Ended | 6/30/16 | 6/30/15 | | |
| Gross Earnings | 2,945,357 | 2,457,746 | 487,610 | 19.4 |
| Net Earnings | 1,621,415 | 1,358,621 | 262,794 | 19.3 |
| Year Ended | 6/30/16 | 6/30/15 | | |
| Gross Earnings | 5,613,608 | 4,765,096 | 848,512 | 17.9 |
| Net Earnings | 3,132,177 | 2,637,671 | 494,506 | 18.7 |

During the year, number of customers (both gas and electric) advanced 12,672 or 15.2%, the total May 31, 1916, being 82,835. Kilowatts connected for all purposes increased 22.5%.

THE STANDARD GAS & ELECTRIC COMPANY, in their new 64 page booklet, showing photographs of the properties and cities served, contains several interesting graphic charts illustrating the stability and progress of gross and net earnings of subsidiaries even during a period which seriously disturbed the country's industrial and commercial fabric.

THE NEW ORLEANS RAILWAY & LIGHT COMPANY has sold to New York and Philadelphia bankers $3,250,000 of refunding and general lien 5% gold bonds, due in 1949, and $3,250,000 of two-year 6 per cent debenture gold notes. The proceeds of the sale will be used to retire $4,000,000 of 6 per cent debenture gold notes which matured on June 1, and to provide funds for other capital requirements. The bonds are being offered to investors at 92 and interest.

THE TEXAS POWER & LIGHT COMPANY, DALLAS, TEX., at a recent meeting of the board of directors, voted to increase the capital stock from $12,000,000 to $13,000,000. Preferred to the amount of the increase, $1,000,000 will be issued at once, the proceeds to go toward financing improvements and extensions in all parts of the state. At the present time, it is understood, the company is erecting many miles of high power transmission lines.

THE CITIES SERVICE COMPANY has offered to buy the stock of the Lincoln (Neb.) Gas & Electric Light Company, offering to exchange for each Lincoln share 35/100 of a share of Cities Service preferred stock, and 7/100 of a share of common stock. This privilege will extend until August 1, 1916. Cities Service Company has also offered to buy all the outstanding preferred stock of the Electric Bond Deposit Company, exchanging one share of Cities Service preferred for each share of Electric Bond Deposit preferred. The exchange privilege also extends until August 1, and in both cases is contingent upon the assent of the holders of 75% of the stock in the company.

THE ALABAMA POWER COMPANY, subsidiary of the Alabama Traction, Light & Power Company, reports gross earnings for June amounting to $121,082, an increase of $35,013; net after taxes $68,938, an increase of $15,565. Gross for 12 months $1,259,500, an increase of $399,269; net after taxes $774,571, an increase of $273,465.

THE OHIO CITIES GAS COMPANY has declared an extra stock dividend of 5% on common stock, in addition to increasing regular annual dividend rate from 8% to 10% by declaration of regular quarterly dividends of 2½%. Stock dividend is payable December 1. With exceptions of Columbia Gas & Fuel Company, subsidiaries have reported large increases for three months ended June 30. Beman G. Dawes, president, is said to have made estimate that combined earnings for 1916 would be $1,200,000 larger than in 1915.

THE CONSOLIDATED GAS, ELECTRIC LIGHT & POWER COMPANY of Baltimore reports earnings for fiscal year ended June 30 to be $7,431,769, an increase of $642,367; net after taxes $3,585,692, an increase of $370,674; fixed charges $1,580,058, a decrease of $60,304; net income $2,003,635, an increase of $431,177; surplus after dividends $871,831, an increase of $364,003; net surplus $97,289, an increase of $97,289. The company also reports for three months ended June 30 gross earnings amounting to $1,846,445, an increase of $197,638; net after taxes $852,728, an increase of $123,489, surplus after charges $480,691, an increase of $166,546.

THE NORTHERN POWER STATES COMPANY reports gross earnings for June amounting to $436,913. Net after taxes $237,447, an increase of $42,162. Gross for 12 months ended June 30, $5,613,608, an increase of $848,512; net after taxes, $3,132,177.

GEORGIA RAILWAY & POWER COMPANY reports estimated gross earnings for June amounting to $544,820, an increase of $33,681; net after taxes $240,051, an increase of $23,897; gross earnings for six months $3,425,424, an increase of $267,591; net after taxes $1,503,581, an increase of $204,047.

THE ALUM ROCK GAS COMPANY has declared an extra dividend of 3%, in addition to regular monthly dividend of 1%.

THE CITIES SERVICE COMPANY'S report for June and six months ended June 30, broke all former records both for gross earnings and for increases over preceding year. For June earnings after payment of all expenses and charges including preferred dividends were equivalent to 2.88% on outstanding stock, or at rate of 34.56 % for year. Earnings for the first six months were equivalent to 14.83% on common stock, or at rate of 29.66% for year.

THE OHIO CITIES GAS COMPANY reports that interest in the company has been secured by several New York bankers, and it is understood that application will soon be made for listing of securities in the New York Stock Exchange.

## Current Prices of Public Utility Securities

| | Bid | Asked |
|---|---|---|
| Adirondack Elec. P. | 25 | 27 |
| Adirondack Elec P. pf | 77 | 80 |
| *American Gas & Electric | 144 | 148 |
| *American Gas & Electric pf | 49 | 51 |
| American Light & Traction | 367 | 371 |
| American Light & Traction pf | 109½ | 111 |
| American Power & Light | 68 | 71 |
| American Power & Light pf | 84 | 86 |
| American Public Utilities | 43 | 47 |
| American Public Utilities pf | 74 | 77 |
| Amer. Water W. & Elec | 7 | 9 |
| Amer. W. W. & E. part'g pf | 16 | 18 |
| Amer. W. W. & E. 1st pf | 55 | 60 |
| Carolina Pow. & Lt | 26 | 30 |
| Carolina Pow. & Lt. pf | 97 | 100 |
| Cities Service | 291 | 294 |
| Cities Service pf | 86 | 87 |
| Colorado Power | 23 | 26 |
| Colorado Power pf | 99½ | 103 |
| Commonwealth, Pr., Ry. & Lt | 64 | 66 |
| Commonwealth, Pr., Ry. & Lt. pf | 85 | 87 |
| Denver Gas & Electric gen. 5s | 96¾ | 97¾ |
| Electric Bond Deposit pf | 85 | 87 |
| Electric Bond & Share pf | 99½ | 102 |
| Empire District El. pf | 88½ | 92½ |
| Federal Light & Traction | 11 | 13 |
| Federal Light & Traction pf | 45 | 49 |
| Gas & Electric Securities | 300 | — |
| Gas & Electric Securities pf | 96 | 99 |
| Northern States Power | 86 | 88 |
| Northern States Power pf | 95 | 98 |
| Pacific Gas & Electric | 58¾ | 60 |
| Pacific Gas & Electric pf | 87 | 90 |
| Republic Ry. & Light Co | 38 | 40 |
| Republic Ry. & Light Co. pf | 73 | 75 |
| *Standard Gas & Electric | 14 | 16 |
| *Standard Gas & Electric pf | 38 | 40 |
| Tennessee Ry., Light & Power | 9 | 12 |
| Tennessee Ry., Light & Power pf | 47 | 50 |
| Toledo Trac., Light & Power | 46 | 51 |
| Toledo Trac., Light & Power pf | 83 | 86 |
| United Light & Railways | 50 | 52 |
| United Light & Railways 1st pf | 74½ | 76½ |

*Par value $50